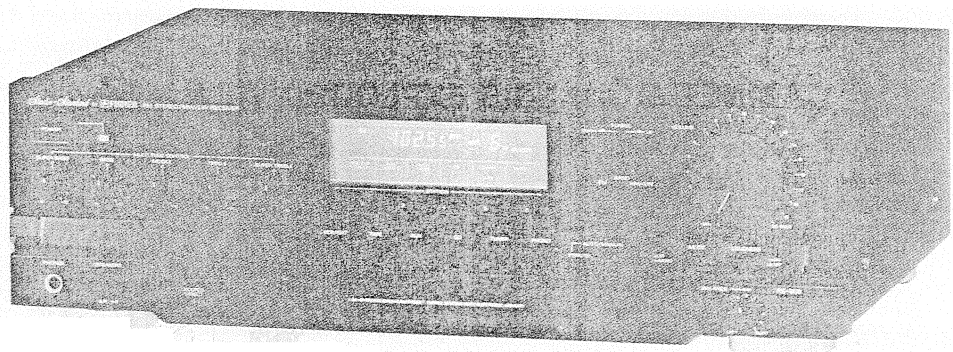
SERVICE MANUAL

FISHER

FM STEREO/MW/LW
RECEIVER

RS-909

(EUROPE)



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SPECIFICATIONS

POWER AMPLIFIER SECTION

Minimum RMS sine wave power per channel within stated bandwidth at no more than stated
Distortion and with 8Ω load ..... 40W (DIN)
Total Harmonic Distortion 0.09%
I.M.Distortion 0.09%
Speaker Damping ..... > 20

PREAMPLIFIER SECTION

Frequency Response
- Phono (RIAA) ..... ±2dB
- AUX (20Hz ~ 20kHz) ..... +0, −2dB

Input Sensitivity and Impedance
- Phono 2.5mV/50kΩ
- Tape Monitor 1,2 ..... 150mV/50kΩ
- AUX/VIDEO/CD 150mV/50kΩ

Phono Max. Input Capability 150mV
Multi Tone Control
- Super Bass ..... 63Hz ±10dB
- Bass ..... 250Hz ±10dB
- Middle ..... 1kHz ±10dB
- Treble ..... 4kHz ±10dB
- Super Treble ..... 16kHz ±10dB

Loudness Contour (100Hz/10kHz) ..... +8dB/+4dB

Hum and Noise (IHF Short Circuit, A Network)
- Phono 70dB
- Tape Monitor 1,2 ..... 80dB
- AUX/VIDEO/CD 80dB
- Source Direct (AUX) 80dB

FM SECTION

Usable Sensitivity
- Mono 1.0μV

46dB Quieting Sensitivity
- Mono 4.0μV

Signal-to-Noise Ratio
- Mono 70dB
- Stereo 63dB

Capture Ratio 2.0dB
Alt. Channel Selectivity(±300kHz) 55dB
Image Response Ratio 70dB
Spurious Response Ratio 95dB
IF Response Ratio ..... > 90dB
AM Suppression Ratio 55dB
Total Harmonic Distortion at 60dBf
- Mono (1kHz) 0.2%
- Stereo (1kHz) 0.3%

Stereo Separation
(100Hz/1kHz/10kHz) 40/40/30dB

– Specifications and design are subject to change without notice. –

REFERENCE No. WM-570227

SPECIFICATIONS (Continued)

Sub-Carrier Rejection (19kHz/38kHz) 30/40dB
Audio Frequency Response
(20Hz ~ 15kHz) ..... ±3.0dB

MW SECTION

Usable Sensitivity 650µV/m
Selectivity (±9kHz) 40dB
Signal-to-Noise Ratio 55dB
Image Response Ratio 35dB
IF Response Ratio 65dB

LW SECTION

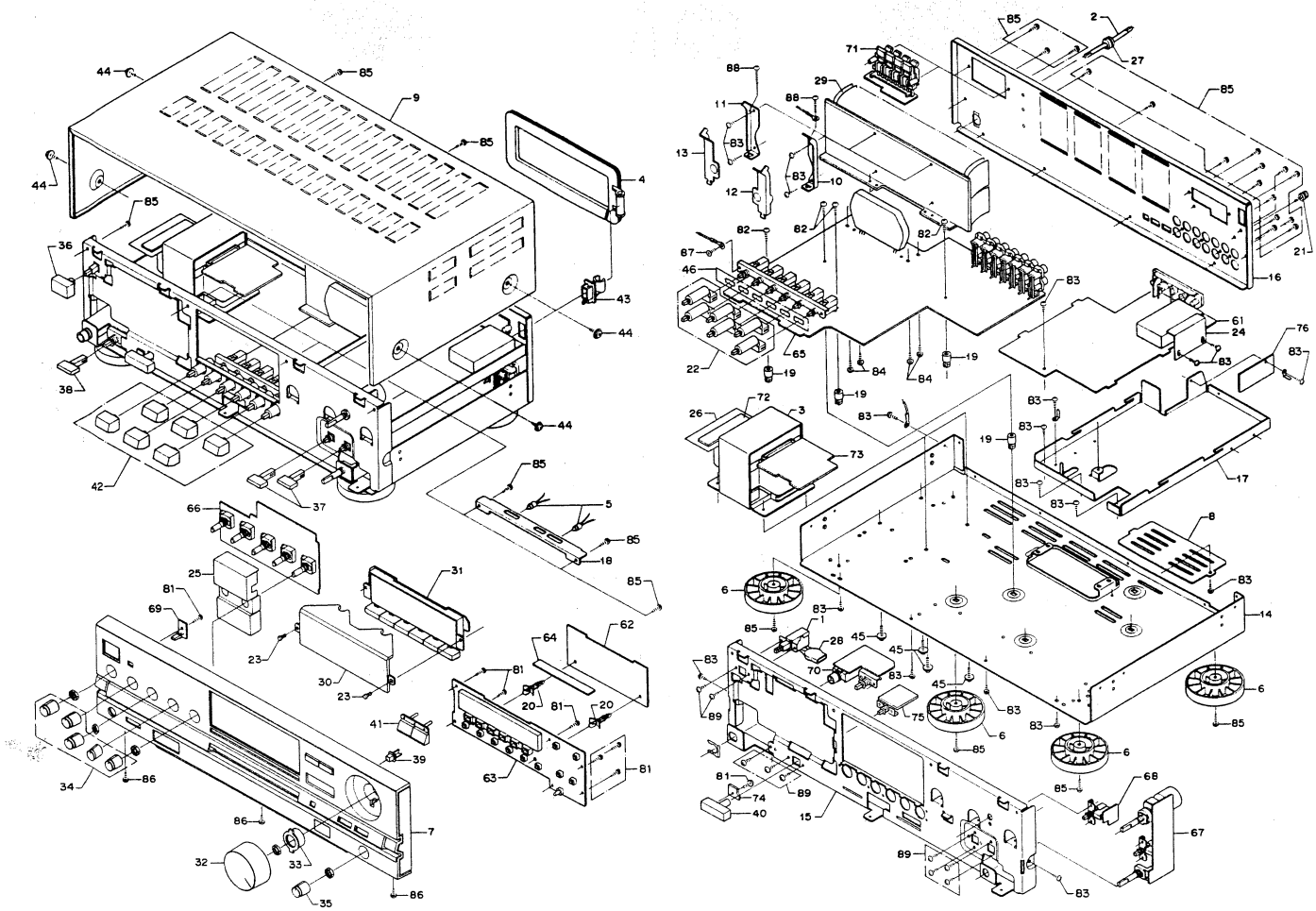
Usable Sensitivity 2000µV/m
Selectivity (±9kHz) 40dB
Signal-to-Noise Ratio 50dB
Image Response Ratio 45dB
IF Response Ratio 65dB

GENERAL

Power Requirements ..... AC 220V
(50Hz) ..... 250 Watts
Dimensions (WxHxD) ..... 440 x 131.5 x 272mm
Weight (approx.) 6.4kg

– Specifications and design are subject to change without notice. –

CABINET & CHASSIS EXPLODED VIEW



CABINET & CHASSIS PARTS LIST

Ref. No.	Part No.	Description	Q'ty
PACKAGE			
	620 192 5487	Box Corrugate-Exp.	1
	620 190 3256	Pad Left	1
	620 190 3263	Pad Right	1
	620 059 6596	Patching Sheet	1
	620 148 5639	Poly Cover (Loop Antenna)	1
	620 148 8012	Sheet Polyethylene	1
	620 152 7452	Serial No. Sheet	2
ACCESSORIES			
	620 193 4410	Bag Fan Assy	1
	620 038 1673	FM Antenna Assy	1
	620 057 8783	Bag Fan	1
	620 062 0543	Serial No. Sheet	1
	620 112 8123	Holder Antenna	1
	620 152 2624	Certificate Card	1
	620 193 4731	Explanatory Booklet	1
CABINET			
	620 022 3461	Terminal Lug	2
	620 125 8424	Wire Band	10
	620 152 7452	Serial No. Sheet	1
C707	⚠ 620 006 6679	Capacitor 0.01MF400V	1
C708	403 047 9607	ELECT 0.1U M 50V	1
C709	403 071 5903	CERAMIC 220P K 50V	1
1	⚠ 620 016 5563	Switch Push Power	1
2	⚠ 620 023 7550	Power Cord	1
3	⚠ 620 193 2195	Power Trans	1
4	620 028 2734	AM Loop Antenna	1
5	620 188 0885	Lamp	2
6	620 185 2752	Leg Assy	4
7	620 192 5425	Panel Decorate Assy	1
8	620 045 6944	Cover Bottom	1
9	620 045 6982	Cover	1
10	620 189 9672	Metal Mount IC RB	1
11	620 189 9689	Metal Mount IC LB	1
12	620 189 9696	Metal Mount IC RF	1
13	620 189 9702	Metal Mount IC LF	1
14	620 048 7450	Chassis	1
15	620 189 9740	Panel Front	1
16	620 192 5456	Panel Rear	1
17	620 189 9801	Chassis Sub	1
18	620 050 1491	Metal Mount Lamp	1
19	620 050 4225	Mount P.C.B.	4
20	620 190 5694	Mount P.C.B.	2
21	620 051 2152	Screw Ground	1
22	620 189 1584	Shaft	6
23	620 191 2746	Rivet 3.5	2
24	620 190 0736	Cover Shield	1
25	620 190 6448	Cover Shield EQ	1
26	620 193 0009	Plate Sever	1
27	620 053 2136	Bushing (MP4N-4)	1
28	620 053 6899	Cover Safety	1
29	620 192 5463	Plate Heat Sink	1
30	620 186 9378	Filter	1
31	620 190 5717	Mount Screen Assy	1
32	620 190 4406	Knob Volume Assy	1
33	620 190 8473	Slide Assy	1
34	620 189 1195	Knob Volume (Graphic EQ)	5
35	620 189 1201	Knob Volume (Balance)	1
36	620 186 4014	Knob (Power)	1
37	620 185 3216	Knob Push (Mono/Loudness)	2
38	620 185 3223	Knob Push (Speaker)	1
39	620 185 3728	Knob Tact (Auto/Manual)	1
40	620 189 1812	Knob Direct (Source Direct)	1
41	620 191 7642	Knob Band (Band Select)	1
42	620 189 1836	Knob (Function)	6
43	620 122 2210	Holder Antenna	1
44	620 123 0284	SCR TPG BIN +M4.0X8	4
45	620 123 0833	SCR Bind TAP-B +M4X10	4
46	620 124 6926	Cushion	6
61	620 193 2836	Tuner P.C.B. Assy	1
62	620 193 2843	Synthesizer P.C.B. Assy	1
63	620 190 9340	Tuner Switch P.C.B. Assy	1
64	620 190 9371	Jumper P.C.B. Assy	1
65	620 193 2850	Main Amplifier P.C.B. Assy	1
66	620 190 9432	G.EQ P.C.B. Assy	1
67	620 193 2874	VR P.C.B. Assy	1
68	620 190 9456	Mode Switch P.C.B. Assy	1
69	620 190 9463	Power IND P.C.B. Assy	1
70	620 190 9470	SP SW,HP P.C.B. Assy	1
71	620 193 2881	SP Terminal P.C.B. Assy	1
72	620 193 2904	Terminal P.C.B. Assy	1
73	620 193 2911	Fuse Terminal Assy	1
74	620 193 2928	S/D IND P.C.B. Assy	1
75	620 193 2935	S/D Switch P.C.B. Assy	1
76	620 190 8930	PCB	1
81	411 020 5706	SCR S-TPG BRZ 2.6X8	8
82	411 020 5904	SCR S-TPG BRZ 3X10	4
83	411 020 7700	SCR S-TPG BRZ 3X6	20
84	411 020 8004	SCR S-TPG BRZ 3X8	4
85	411 099 9803	SCR S-TPG BRZ 3X8	26
86	411 021 5903	SCR S-TPG BIN 3X6	3
87	411 034 6409	SCR FLT 3X6	1
88	411 002 6806	SCR PAN 3X14	2
89	411 002 8503	SCR PAN 3X6	9

NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

CAUTION ON RF ADJUSTMENT

This model uses a microprocessor for memory preset control for the various bands.
This function has been used to preset frequency points for the different bands to permit adjustment and make it possible to check the function of the microprocessor. To use this supplemental function, ground initialize the lead of R118 on the Synthesizer P.C.Board for 1 second before beginning adjustment. The following table shows the initially preset frequencies.

Band	Memory					
	1	2	3	4	5	6
FM-1	87.5MHz	108MHz	88MHz	98MHz	108Hz	90MHz
MW/LW	603kHz	1404kHz	999kHz	160kHz	350kHz	250kHz

FM TUNER ALIGNMENT

FM ALIGNMENT – Band Selector switch to FM/ST(MUTE) position.
Note is almost unnecessary to adjust coil in Front End as perfectly adjusted.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. FM IF S-CURVE ALIGNMENT	Connect 10.7MHz Radio IF Genescope output to Pin IF (Front End) and ground lead to chassis. Use 5pF capacitor in series with generator output lead.	Position of non-interference Minimum Frequency.	Connect Radio IF Genescope input to TP209 and ground lead to chassis.	Adjust FM DET 1 Coil (T207) and FM DET 2 (T206) so that S-wave from becomes symmetrical.
2. DETECTOR ADJUSTMENT (MINIMUM T.H.D.)	Connect FM RF signal generator through FM Dummy Antenna to FM Antenna terminals. Set generator to 98MHz ±2kHz. Modulate with 1kHz to provide ±40kHz deviation. Setting generator with attenuator output level for 60dBμV.	Set MODE switch to FM MONO position and Preset STATION button to "4" posion. Set to 98MHz.	Connect DC Voltmeter across TP206 and TP208.	Adjust FM DET 1 Coil (T207) until DC Voltmeter reads 0V ±50mV.
			Connect Harmonic Distortion Analyzer to REC OUT.	Adjust FM DET 2 Coil (T206) for minimum gain and best linearity.
Note: Repeat Step 1 (FM DET 1 Coil T207) and 2 (FM DET 2 Coil T206) until optimum alignment is reached.				
3. FM STEREO SIGNAL SEPARATION CONTROL	Connect FM Stereo SG to FM Antenna terminals. 19kHz signal ON. Main channel, sub channel signal ON. Apply 1000Hz signal from LEFT channel.	Same as above. Set Mode switch to ST(MUTE) position.	Connect AC VTVM and Oscilloscope to REC OUT.	Adjust VR203 for minimum output.
	Same as above for RIGHT channel.		Connect AC VTVM and Oscilloscope to REC OUT.	
4. FM MUTING AUTO STOP SENSITIVITY ADJUSTMENT	Set generator to 98MHz. Adjust attenuator output level to 16dBμV.	Same as above.	Front panel TUNED Indicator Display.	Set Mode Switch to ST(MUTE). Adjust VR202 until the TUNED Indicator partly light up.
Note: Decrease the output level of ATT and confirm that the wave form disappears. Increase the output level of ATT again and confirm that the input level meets the specifications sufficiently when the wave form has appeared.				

Use a screwdriver with plastic grip for all adjustments.

MW Frequency Cover Range
Tuning Voltage Value at TP 202

(Table 1)

	522kHz	1611kHz
Minimum	0.9V	7.0V
Typical	1.0V	8.0V
Maximum	1.3V	9.0V

LW Frequency Cover Range
Tuning Voltage Value at TP 202

(Table 2)

	153kHz	360kHz
Minimum	1.0V	7.0V
Typical	1.0V	7.5V
Maximum	1.8V	9.0V

AM TUNER ALIGNMENT

AM ALIGNMENT – Band Selector switch to MW or LW position.
Maintain generator output as low as possible for suitable indication.

Note: Perform this alignment after FM Tuner Alignment.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. AM IF ALIGNMENT	Connect 450kHz Radio IF Genescope output to Pin TP1 and TP2 Adjust output level to 70dBμV.	Position of non-interference Minimum Frequency.	Connect Radio IF Genescope input to TP205 and ground lead to chassis.	Adjust AM IFT (T205) for maximum gain and best symmetry. Keep signal low enough for noise on response.
2. MW RF FREQUENCY COVER ALIGNMENT (1611kHz)	Do not connect generator.	Front Panel DIGITAL Counter Display Set to 1611kHz.	Connect DC Voltmeter to TP202 and ground lead to chassis.	Check DC Voltmeter for Indication 7.0V ~ 9.0V.
3. (522kHz)	Same as above.	DIGITAL Counter Display Set to 522kHz.	Same as above.	Check DC Voltmeter for Indication 0.9V ~ 1.3V.
Note: Repeat the adjustments in items 2 and 3. Then, confirm that each voltage becomes 1.0V to 8.0V at receiving frequency of 522kHz to 1611kHz. **(See Table 1)**				
4. LW RF FREQUENCY COVER ALIGNMENT (360kHz)	Do not connect generator.	Front Panel DIGITAL Counter Display Set to 360kHz.	Connect DC Voltmeter to TP202 and ground lead to chassis.	Check DC Voltmeter for Indication 7.0V ~ 9.0V.
5. (153kHz)	Same as above.	DIGITAL Counter Display Set to 153kHz.	Same as above.	Check DC Voltmeter for Indication 1.0V ~ 1.8V.
Note: Repeat the adjustments in Items 4 and 5. Then, confirm that each voltage becames 1.0V to 7.5V at receiving frequency of 153kHz to 360kHz. **(See Table 2)**				
6. MW RF TRACKING ALIGNMENT (603kHz)	Connect Standard Loop Antenna to output terminal of AM RF Signal Generator. Place Loop Antenna 60cm away from Loop antenna (Unit). Generator Setting to 603kHz or 1404kHz. Modulate with 400Hz (30 % modulation).	Set Preset STATION button to "1" position. Set to 603kHz.	Connect AC VTVM and Oscilloscope to REC OUT.	Adjust MW ANT Coil (T201) for maximum gain output.
7. (1404kHz)		Change Preset STATION button to "2" position. Set to 1404kHz.	Same as above.	Adjust MW ANT Trimmer (TC201) for maximum gain output.
Note: Repeat the adjustments in Items 6 and 7. Then, confirm there is no tracking error.				
8. LW RF TRACKING ALIGNMENT (160kHz)	Change generator setting to 160kHz.	Set Preset STATION button to "4" position. Set to 160kHz.	Connect AC VTVM and Oscilloscope to REC OUT.	Adjust LW ANT Coil (T202) for maximum gain output.
9. (350kHz)	Change generator setting to 350kHz.	Change Preset STATION button to "5" position. Set to 350kHz.	Same as above.	Adjust LW ANT Trimmer (TC202) for maximum gain output.
Note: Repeat the adjustments in Items 8 and 9. Then, confirm there is no tracking error.				
10. AM AUTO STOP SENSITIVITY ADJUSTMENT	Change generator setting to 999kHz and output level to 60dBμV/m.	Set Preset STATION button to "3" position. Set to 999kHz.	Front Panel TUNED Indicator Display.	Adjust VR201 until the Indicator partly light up.

Use a screwdriver with plastic grip for all adjustments.

P.C.BOARD PARTS LIST

Ref. No.	Part No.	Description	Q'ty
TUNER P.C.B. ASSY			
61	620 193 2836	Tuner P.C.B. Assy	1
	620 191 8632	FM Front End 4EU AGC	1
		(Component parts used in Front End are not serviceable and available.)	
	620 022 2921	ANT Terminal 3P	1
	411 020 8004	SCR S-TPG BRZ 3X8	1
	620 031 4763	Wire Wrap Terminal	10
	620 052 9297	Cover Shield	1
	620 053 8848	Plate Heat Sink	1
CF201	620 014 5664	Ceramic Filter	1
CF202	620 014 5664	Ceramic Filter	1
CF204	620 014 6258	Ceramic OSC	1
CF205	620 014 5862	Ceramic Filter 450kHz	1
CN201	620 021 6203	Connector 5P	1
CN202	620 021 6227	Connector 10P	1
CN203	620 182 8955	Plug 3P	1
CN204	620 182 8993	Plug 4P	1
F201	620 191 6607	FTZ Antenna Filter	1
ICP201	620 017 0734	Protector ICP-5	1
L201	620 026 5522	Choke Coil 470UH	1
L203	620 026 8103	Choke Coil 470UH	1
L204	620 026 8103	Choke Coil 470UH	1
TC201	620 007 0867	Trimmer 10PF	1
TC202	620 189 9108	Trimmer 20PF	1
T201	620 185 9041	MW Antenna Coil	1
T202	620 028 1362	LW Antenna Coil	1
T203	620 185 9058	OSC Coil MW	1
T204	620 028 7845	OSC Coil LW	1
T205	620 190 9227	IFT AM	1
T206	620 189 6015	IFT DET 10.7MHz 2nd K	1
T207	620 189 6008	IFT DET 10.7MHz 1st K	1
T208	620 026 4396	Anti Birdie Filter	1
T209	620 026 4518	LP Filter	1
T210	620 026 4518	LP Filter	1
VR201	620 006 1377	Potentiometer 10KB	1
VR202	620 006 1353	Potentiometer 100KB	1
VR203	620 006 1353	Potentiometer 100KB	1
X201	620 007 1338	Crystal 7.2MHz	1
or	620 007 3226	Crystal 7.2MHz	1
IC201	409 073 9505	IC LA1266	1
IC202	409 017 0803	IC LA3400	1
IC203	409 025 7306	IC LM7000	1
IC204	409 074 0808	IC LA5667	1
Q201	405 016 0806	TR 2SC2839-E	1
Q202	405 027 0505	TR 2SK246-GR	1
Q203	405 021 0105	TR 2SD1012-F	1
or	405 021 0501	TR 2SD1012-G	1
Q204	405 021 0501	TR 2SD1012-G	1
Q205	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q206	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q207	405 004 5004	TR 2SA608-G-NP	1
or	405 004 4502	TR 2SA608-F-NP	1
Q210	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q211	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q212	405 004 5004	TR 2SA608-G-NP	1
or	405 004 4502	TR 2SA608-F-NP	1
Q213	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q214	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q215	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q216	405 004 5004	TR 2SA608-G-NP	1
or	405 004 4502	TR 2SA608-F-NP	1
Q217	405 004 5004	TR 2SA608-G-NP	1
or	405 004 4502	TR 2SA608-F-NP	1
Q218	405 027 8402	TR 2SK583	1
or	405 038 3809	TR 2SK669	1
Q219	405 027 8402	TR 2SK583	1

Ref. No.	Part No.	Description	Q'ty
		If necessary, replace both Diode D201, D203 (SVC321) together with new ones which have the equivalent characteristics.	
D201	407 000 4807	VARACTOR DI SVC321D-2	1
or	407 000 4708	VARACTOR DI SVC321C-2	1
D203	407 000 4807	VARACTOR DI SVC321D-2	1
or	407 000 4708	VARACTOR DI SVC321C-2	1
D204	407 008 0405	DIODE GMB01-BT	1
D205	407 008 0405	DIODE GMB01-BT	1
D206	407 008 0405	DIODE GMB01-BT	1
D207	407 008 0405	DIODE GMB01-BT	1
D208	407 008 0405	DIODE GMB01-BT	1
D209	407 049 6008	ZENER DIODE GZA11Y-BT	1
D210	407 008 0405	DIODE GMB01-BT	1
C202	403 043 4903	ELECT 33U M 16V	1
C203	403 069 8404	CERAMIC 0.01U Z 50V	1
C204	403 069 8404	CERAMIC 0.01U Z 50V	1
C205	403 071 0601	CERAMIC 0.015U Z 50V	1
C206	403 074 2701	CERAMIC 0.047U Z 50V	1
C208	403 026 5408	CERAMIC 47P K 50V	1
C209	403 074 2701	CERAMIC 0.047U Z 50V	1
C210	403 074 2701	CERAMIC 0.047U Z 50V	1
C211	403 050 1209	ELECT 2.2U M 50V	1
C212	403 031 0306	CERAMIC 68P K 50V	1
C213	403 018 4204	CERAMIC 22P K 50V	1
C214	403 074 2701	CERAMIC 0.047U Z 50V	1
C215	403 074 2701	CERAMIC 0.047U Z 50V	1
C216	403 088 1707	STYRENE 340P J 50V	1
C217	403 042 0302	ELECT 10U M 16V	1
C218	403 038 2303	ELECT 100U M 6.3V	1
C219	403 069 8404	CERAMIC 0.01U Z 50V	1
C220	403 042 0302	ELECT 10U M 16V	1
C221	403 028 8001	CERAMIC 56P K 50V	1
C222	403 047 1502	ELECT 4.7U M 25V	1
C223	403 050 7706	ELECT 3.3U M 50V	1
C224	403 047 1502	ELECT 4.7U M 25V	1
C225	403 069 8404	CERAMIC 0.01U Z 50V	1
C226	403 049 1609	ELECT 1U M 50V	1
C227	403 069 8404	CERAMIC 0.01U Z 50V	1
C228	403 060 8403	POLYESTER 0.033U K 50V	1
C229	403 074 2701	CERAMIC 0.047U Z 50V	1
C230	403 074 2701	CERAMIC 0.047U Z 50V	1
C231	403 074 2701	CERAMIC 0.047U Z 50V	1
C232	403 075 4308	CERAMIC 820P K 50V	1
C233	403 043 7003	ELECT 330U M 16V	1
C234	403 069 8404	CERAMIC 0.01U Z 50V	1
C235	403 069 8404	CERAMIC 0.01U Z 50V	1
C236	403 069 0705	CERAMIC 1000P K 50V	1
C237	403 049 1609	ELECT 1U M 50V	1
C238	403 039 2906	ELECT 47U M 6.3V	1
C239	403 069 8404	CERAMIC 0.01U Z 50V	1
C240	403 042 3501	ELECT 100U M 16V	1
C241	403 049 1609	ELECT 1U M 50V	1
C242	403 048 7602	ELECT 0.47U M 50V	1
C243	403 050 1209	ELECT 2.2U M 50V	1
C244	403 069 8404	CERAMIC 0.01U Z 50V	1
C245	403 075 0508	CERAMIC 6800P K 50V	1
C246	403 073 3006	CERAMIC 390P K 50V	1
C247	403 073 8407	CERAMIC 4700P K 50V	1
C248	403 062 0504	POLYESTER 0.047U K 50V	1
C249	403 069 0705	CERAMIC 1000P K 50V	1
C250	403 042 0302	ELECT 10U M 16V	1
C251	403 073 3006	CERAMIC 390P K 50V	1
C252	403 073 3006	CERAMIC 390P K 50V	1
C253	403 042 0302	ELECT 10U M 16V	1
C254	403 042 0302	ELECT 10U M 16V	1
C255	403 072 5407	CERAMIC 2700P K 50V	1
C256	403 072 5407	CERAMIC 2700P K 50V	1
C257	403 042 0302	ELECT 10U M 16V	1
C258	403 040 2704	ELECT 22U M 10V	1
C259	403 049 1609	ELECT 1U M 50V	1
C260	403 045 7100	ELECT 22U M 25V	1
C261	403 074 2701	CERAMIC 0.047U Z 50V	1
C262	403 040 2704	ELECT 22U M 10V	1
C263	403 072 7906	CERAMIC 330P K 50V	1
C264	403 069 0705	CERAMIC 1000P K 50V	1
C265	403 022 5907	CERAMIC 33P J 50V	1
C266	403 023 9607	CERAMIC 39P J 50V	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
C267	403 049 1609	ELECT 1U M 50V	1
C268	403 049 1609	ELECT 1U M 50V	1
C269	403 047 9607	ELECT 0.1U M 50V	1
C270	403 044 0201	ELECT 47U M 16V	1
C272	403 088 4104	STYRENE 430P J 50V	1
C273	403 050 1209	ELECT 2.2U M 50V	1
C274	403 009 8105	CERAMIC 100P K 50V	1
R202	401 016 3809	CARBON 2.2K JA 1/4W	1
R203	401 012 4107	CARBON 100 JA 1/4W	1
R204	401 012 4107	CARBON 100 JA 1/4W	1
R205	401 027 9005	CARBON 82K JA 1/6W	1
R206	401 027 0309	CARBON 47K JA 1/6W	1
R207	401 025 7805	CARBON 2.2K JA 1/6W	1
R208	401 026 6609	CARBON 390 JA 1/6W	1
R209	401 027 8305	CARBON 820 JA 1/6W	1
R210	401 026 6609	CARBON 390 JA 1/6W	1
R211	401 024 7004	CARBON 1K JA 1/6W	1
R212	401 024 8001	CARBON 1M JA 1/6W	1
R213	401 026 6609	CARBON 390 JA 1/6W	1
R214	401 026 1000	CARBON 2.7K JA 1/6W	1
R215	401 012 4503	CARBON 100 JA 1/4W	1
R216	401 012 5708	CARBON 1K JA 1/4W	1
R217	401 024 8001	CARBON 1M JA 1/6W	1
R218	401 026 4308	CARBON 3.3K JA 1/6W	1
R219	401 025 8208	CARBON 22K JA 1/6W	1
R220	401 026 7408	CARBON 39K JA 1/6W	1
R221	401 027 9005	CARBON 82K JA 1/6W	1
R223	401 025 8208	CARBON 22K JA 1/6W	1
R224	401 024 7707	CARBON 100K JA 1/6W	1
R225	401 024 7707	CARBON 100K JA 1/6W	1
R226	401 026 9907	CARBON 4.7K JA 1/6W	1
R227	401 025 1902	CARBON 15K JA 1/6W	1
R228	401 027 2600	CARBON 5.6K JA 1/6W	1
R229	401 026 9907	CARBON 4.7K JA 1/6W	1
R230	401 025 1902	CARBON 15K JA 1/6W	1
R231	401 026 4308	CARBON 3.3K JA 1/6W	1
R232	401 025 7805	CARBON 2.2K JA 1/6W	1
R233	401 020 0801	CARBON 470 JA 1/4W	1
R234	401 027 2303	CARBON 560 JA 1/6W	1
R235	401 027 2303	CARBON 560 JA 1/6W	1
R236	402 015 4705	FUSIBLE RES 47 J- 1/4W	1
R237	401 025 8208	CARBON 22K JA 1/6W	1
R238	401 024 7707	CARBON 100K JA 1/6W	1
R239	401 026 7408	CARBON 39K JA 1/6W	1
R240	401 025 2305	CARBON 150K JA 1/6W	1
R242	401 025 8208	CARBON 22K JA 1/6W	1
R248	401 017 1804	CARBON 2.7K JA 1/4W	1
R249	401 016 4806	CARBON 22K JA 1/4W	1
R250	401 027 0309	CARBON 47K JA 1/6W	1
R251	401 024 7707	CARBON 100K JA 1/6W	1
R252	401 026 9907	CARBON 4.7K JA 1/6W	1
R253	401 025 8208	CARBON 22K JA 1/6W	1
R254	401 026 4308	CARBON 3.3K JA 1/6W	1
R255	401 022 3107	CARBON 6.8K JA 1/4W	1
R256	401 025 8208	CARBON 22K JA 1/6W	1
R257	401 026 1604	CARBON 270K JA 1/6W	1
R258	401 024 7400	CARBON 10K JA 1/6W	1
R259	401 012 4107	CARBON 100 JA 1/4W	1
R260	401 024 7004	CARBON 1K JA 1/6W	1
R261	401 025 8208	CARBON 22K JA 1/6W	1
R262	401 025 2305	CARBON 150K JA 1/6W	1
R263	401 026 4308	CARBON 3.3K JA 1/6W	1
R264	401 024 7400	CARBON 10K JA 1/6W	1
R265	401 026 4308	CARBON 3.3K JA 1/6W	1
R266	401 024 7400	CARBON 10K JA 1/6W	1
R267	401 025 3500	CARBON 160K JA 1/6W	1
R268	401 025 3500	CARBON 160K JA 1/6W	1
R269	401 025 7805	CARBON 2.2K JA 1/6W	1
R270	401 025 7805	CARBON 2.2K JA 1/6W	1
R271	401 026 9907	CARBON 4.7K JA 1/6W	1
R272	401 026 9907	CARBON 4.7K JA 1/6W	1
R273	401 024 7004	CARBON 1K JA 1/6W	1
R274	401 024 7004	CARBON 1K JA 1/6W	1
R275	401 018 3807	CARBON 3.3K JA 1/4W	1
R276	401 018 3807	CARBON 3.3K JA 1/4W	1
R277	401 025 7805	CARBON 2.2K JA 1/6W	1
R278	401 018 4903	CARBON 33K JA 1/4W	1
R279	401 018 4903	CARBON 33K JA 1/4W	1
R280	401 024 7400	CARBON 10K JA 1/6W	1
R281	401 012 8105	CARBON 100K JA 1/4W	1
R282	401 016 1102	CARBON 22 JA 1/4W	1
R283	401 012 5708	CARBON 1K JA 1/4W	1
R284	401 012 5708	CARBON 1K JA 1/4W	1
R285	401 026 9907	CARBON 4.7K JA 1/6W	1
R286	401 026 4308	CARBON 3.3K JA 1/6W	1
R287	401 027 2600	CARBON 5.6K JA 1/6W	1
R288	401 024 7400	CARBON 10K JA 1/6W	1
R289	401 012 5708	CARBON 1K JA 1/4W	1
R290	401 025 8208	CARBON 22K JA 1/6W	1
R291	401 025 8208	CARBON 22K JA 1/6W	1
R292	401 026 1604	CARBON 270K JA 1/6W	1
R293	401 026 1604	CARBON 270K JA 1/6W	1
R294	401 024 7707	CARBON 100K JA 1/6W	1
R295	401 027 2600	CARBON 5.6K JA 1/6W	1
R296	401 024 7400	CARBON 10K JA 1/6W	1
R398	401 025 8208	CARBON 22K JA 1/6W	1
SYNTHESIZER P.C.B. ASSY			
62	620 193 2843	Synthesizer P.C.B. Assy	1
CF101	620 190 9029	Ceramic OSC	1
CN201	620 193 2737	Connector 5P Assy	1
CN202	620 190 9111	Connector 10P Assy	1
IC101	410 055 0700	IC TSE1039AN-012	1
D114	407 008 0405	DIODE GMB01-BT	1
D115	407 050 6202	ZENER DIODE GZA6.2Y-BT	1
D119	407 005 3805	DIODE DS442-BT	1
D121	407 008 0405	DIODE GMB01-BT	1
D124	407 005 3805	DIODE DS442	1
C101	403 041 3304	ELECT 47U M 10V	1
C103	404 039 4303	ELECT 2200U M 10V	1
or	404 032 2207	ELECT 2200U M 10V	1
C104	403 022 5907	CERAMIC 33P J 50V	1
C105	403 022 5907	CERAMIC 33P J 50V	1
C106	403 050 1605	ELECT 2.2U M 50V	1
C109	403 052 6905	ELECT 10U M 35V	1
C111	403 074 2701	CERAMIC 0.047U Z 50V	1
R107	401 024 7400	CARBON 10K JA 1/6W	1
R108	401 024 7400	CARBON 10K JA 1/6W	1
R109	401 024 7400	CARBON 10K JA 1/6W	1
R110	401 024 7400	CARBON 10K JA 1/6W	1
R111	401 016 4806	CARBON 22K JA 1/4W	1
R112	401 020 2904	CARBON 47K JA 1/4W	1
R113	401 012 7009	CARBON 10K JA 1/4W	1
R114	401 012 7009	CARBON 10K JA 1/4W	1
R115	401 012 7009	CARBON 10K JA 1/4W	1
R116	401 022 0809	CARBON 68 JA 1/4W	1
R117	401 022 0809	CARBON 68 JA 1/4W	1
R118	401 026 3905	CARBON 330 JA 1/6W	1
TUNER SWITCH P.C.B. ASSY			
63	620 190 9340	Tuner Switch P.C.B. Assy	1
	620 186 6247	Digitron 7-BT-105GK	1
	620 015 1917	Keyboard Switch 6 mm	10
	620 016 7796	Tact Switch	1
	620 189 1553	Spacer	1
	620 190 6431	Cushion	1
CN404	620 190 9128	Connector 7P Assy	1
D101	407 008 0405	DIODE GMB01-BT	1
D102	407 008 0405	DIODE GMB01-BT	1
D103	407 008 0405	DIODE GMB01-BT	1
D104	407 008 0405	DIODE GMB01-BT	1
D105	407 005 3805	DIODE DS442-BT	1
D106	407 005 3805	DIODE DS442-BT	1
D107	407 005 3805	DIODE DS442-BT	1
D108	407 102 7706	LED SEL2813A	1
D109	407 102 7706	LED SEL2813A	1
D110	407 102 7706	LED SEL2813A	1
D111	407 102 7706	LED SEL2813A	1
D112	407 062 7204	LED SEL2213C	1
D113	407 062 7204	LED SEL2213C	1
JUMPER P.C.B. ASSY			
64	620 190 9371	Jumper P.C.B. Assy	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
MAIN AMPLIFIER P.C.B. ASSY			
65	620 193 2850	Main Amplifier P.C.B. Assy	1
	620 190 9036	Switch Push 6KEY	1
	620 188 9925	Pin Jack 4P Black	2
	620 188 9932	Pin Jack 6P Black	1
	620 020 5887	Connector 1P Assy	2
	620 020 5894	Connector 1P Assy	1
	411 020 8004	SCR S-TPG BRZ 3X8	2
	620 031 4763	Wire Wrap Terminal	2
	620 053 7247	Plate Heat Sink	2
CN203	620 190 9081	Connector 3P Assy	1
CN204	620 190 9098	Connector 4P Assy	1
CN402	620 182 8955	Plug 3P	1
CN403	620 182 9006	Plug 5P	1
CN404	620 182 9013	Plug 7P	1
L401	620 027 1240	AF Coil	1
L402	620 027 1240	AF Coil	1
	620 191 6355	Jumper	1
	620 055 4930	Jumper	1
IC401	409 057 4403	IC UPC4570C	1
IC402	409 057 4403	IC UPC4570C	1
IC403	410 057 1200	IC STK4171MK5-SA	1
Q401	405 018 0101	TR 2SC3331-T	1
or	405 018 0200	TR 2SC3331-U	1
Q402	405 018 0101	TR 2SC3331-T	1
or	405 018 0200	TR 2SC3331-U	1
Q403	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q404	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q405	405 004 4502	TR 2SA608-F-NP	1
or	405 004 5004	TR 2SA608-G-NP	1
Q406	405 004 4502	TR 2SA608-F-NP	1
or	405 004 5004	TR 2SA608-G-NP	1
Q411	405 035 7107	TR 2SD1913-R	1
or	405 035 7206	TR 2SD1913-S	1
or	405 022 5000	TR 2SD1406-Y	1
or	405 022 4904	TR 2SD1406-GR	1
Q412	405 007 5308	TR 2SB560-F-MP	1
or	405 007 5100	TR 2SB560-E-MP	1
Q413	405 006 6702	TR 2SA984-F	1
or	405 006 6504	TR 2SA984-E	1
Q414	405 035 7107	TR 2SD1913-R	1
or	405 035 7206	TR 2SD1913-S	1
or	405 022 5000	TR 2SD1406-Y	1
or	405 022 4904	TR 2SD1406-GR	1
Q415	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q416	405 019 3804	TR 2SC536-G-NP	1
or	405 019 2708	TR 2SC536-F-NP	1
Q417	405 004 4502	TR 2SA608-F-NP	1
or	405 004 5004	TR 2SA608-G-NP	1
Q418	405 003 5302	TR 2SA1317-T	1
D405	407 008 0405	DIODE GMB01-BT	1
D406	407 008 0405	DIODE GMB01-BT	1
D407	407 008 0405	DIODE GMB01-BT	1
D408	407 008 0405	DIODE GMB01-BT	1
D409	407 008 0405	DIODE GMB01-BT	1
D410	407 008 0405	DIODE GMB01-BT	1
D411	407 008 0405	DIODE GMB01-BT	1
D412	407 008 0405	DIODE GMB01-BT	1
D413	407 008 0405	DIODE GMB01-BT	1
D414	407 008 0405	DIODE GMB01-BT	1
D415	407 008 0405	DIODE GMB01-BT	1
D416	407 008 0405	DIODE GMB01-BT	1
D417	407 008 0405	DIODE GMB01-BT	1
D418	407 008 0405	DIODE GMB01-BT	1
D419	407 008 0405	DIODE GMB01-BT	1
D420	407 008 0405	DIODE GMB01-BT	1
D421	407 049 7807	ZENER DIODE GZA18Y-BT	1
D422	407 049 7807	ZENER DIODE GZA18Y-BT	1
D423	407 050 0507	ZENER DIODE GZA27Z	1
D424	407 050 0101	ZENER DIODE GZA24Y	1
D428	407 008 0405	DIODE GMB01-BT	1
D429	407 004 9105	DIODE DSF10C-BT	1
D430	407 092 3900	DIODE DSB15TC-KC5	1
D431	407 092 3900	DIODE DSB15TC-KC5	1
D432	407 092 3900	DIODE DSB15TC-KC5	1
D433	407 092 3900	DIODE DSB15TC-KC5	1

Ref. No.	Part No.	Description	Q'ty
D435	407 049 5506	ZENER DIODE GZA10Y	1
D436	407 005 3805	DIODE DS442-BT	1
C401	403 018 8509	CERAMIC 220P K 50V	1
C402	403 018 8509	CERAMIC 220P K 50V	1
C403	403 018 8509	CERAMIC 220P K 50V	1
C404	403 018 8509	CERAMIC 220P K 50V	1
C405	403 047 1502	ELECT 4.7U M 25V	1
C406	403 047 1502	ELECT 4.7U M 25V	1
C407	403 018 8509	CERAMIC 220P K 50V	1
C408	403 018 8509	CERAMIC 220P K 50V	1
C411	403 039 2906	ELECT 47U M 6.3V	1
C412	403 039 2906	ELECT 47U M 6.3V	1
C413	403 059 0401	POLYESTER 0.018U K 50V	1
C414	403 059 0401	POLYESTER 0.018U K 50V	1
C415	403 073 8407	CERAMIC 4700P K 50V	1
C416	403 073 8407	CERAMIC 4700P K 50V	1
C417	403 047 1502	ELECT 4.7U M 25V	1
C418	403 047 1502	ELECT 4.7U M 25V	1
C421	403 045 0507	ELECT 100U M 25V	1
C422	403 045 0507	ELECT 100U M 25V	1
C425	403 018 8509	CERAMIC 220P K 50V	1
C426	403 018 8509	CERAMIC 220P K 50V	1
C427	403 018 8509	CERAMIC 220P K 50V	1
C428	403 018 8509	CERAMIC 220P K 50V	1
C429	403 018 8509	CERAMIC 220P K 50V	1
C430	403 018 8509	CERAMIC 220P K 50V	1
C431	403 018 8509	CERAMIC 220P K 50V	1
C432	403 018 8509	CERAMIC 220P K 50V	1
C433	403 018 8509	CERAMIC 220P K 50V	1
C434	403 018 8509	CERAMIC 220P K 50V	1
C435	403 018 8509	CERAMIC 220P K 50V	1
C436	403 018 8509	CERAMIC 220P K 50V	1
C439	403 049 1609	ELECT 1U M 50V	1
C440	403 049 1609	ELECT 1U M 50V	1
C441	403 018 8509	CERAMIC 220P K 50V	1
C442	403 018 8509	CERAMIC 220P K 50V	1
C443	403 042 0302	ELECT 10U M 16V	1
C444	403 042 0302	ELECT 10U M 16V	1
C447	403 049 1609	ELECT 1U M 50V	1
C448	403 049 1609	ELECT 1U M 50V	1
C449	403 009 8105	CERAMIC 100P K 50V	1
C450	403 009 8105	CERAMIC 100P K 50V	1
C451	403 008 5204	CERAMIC 10P D 50V	1
C452	403 008 5204	CERAMIC 10P D 50V	1
C453	403 047 1502	ELECT 4.7U M 25V	1
C454	403 047 1502	ELECT 4.7U M 25V	1
C457	403 042 0302	ELECT 10U M 16V	1
C458	403 042 0302	ELECT 10U M 16V	1
C459	403 072 5407	CERAMIC 2700P K 50V	1
C460	403 072 5407	CERAMIC 2700P K 50V	1
C461	403 033 7303	CERAMIC 82P K 50V	1
C462	403 033 7303	CERAMIC 82P K 50V	1
C463	403 050 1209	ELECT 2.2U M 50V	1
C464	403 050 1209	ELECT 2.2U M 50V	1
C465	403 009 8105	CERAMIC 100P K 50V	1
C466	403 009 8105	CERAMIC 100P K 50V	1
C467	403 039 2906	ELECT 47U M 6.3V	1
C468	403 039 2906	ELECT 47U M 6.3V	1
C469	403 015 1602	CERAMIC 2P C 50V	1
C470	403 015 1602	CERAMIC 2P C 50V	1
C471	403 051 3806	ELECT 47U M 50V	1
C472	403 051 3806	ELECT 47U M 50V	1
C473	403 051 3806	ELECT 47U M 50V	1
C474	403 049 5409	ELECT 10U M 50V	1
C475	403 072 2703	CERAMIC 0.022U Z 50V	1
C476	403 072 2703	CERAMIC 0.022U Z 50V	1
C477	403 072 2703	CERAMIC 0.022U Z 50V	1
C478	403 072 2703	CERAMIC 0.022U Z 50V	1
C479	403 062 0900	POLYESTER 0.047U K 50V	1
C480	403 062 0900	POLYESTER 0.047U K 50V	1
C482	403 053 1404	ELECT 22U M 35V	1
C483	403 052 1009	ELECT 22U M 63V	1
C484	403 045 7100	ELECT 22U M 25V	1
C485	403 045 7100	ELECT 22U M 25V	1
C486	403 053 1404	ELECT 22U M 35V	1
C487	403 045 7100	ELECT 22U M 25V	1
C488	403 072 2703	CERAMIC 0.022U Z 50V	1
C489	404 040 5009	ELECT 4700U M 50V	1
C490	404 040 5009	ELECT 4700U M 50V	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description		Q'ty
C495	404 012 7000	CERAMIC	0.01U P 500V	1
C497	403 009 8105	CERAMIC	100P K 50V	1
C498	403 009 8105	CERAMIC	100P K 50V	1
C499	403 072 2703	CERAMIC	0.022U Z 50V	1
C501	403 044 0201	ELECT	47U M 16V	1
C502	403 047 1502	ELECT	4.7U M 25V	1
C503	403 051 2007	ELECT	4.7U M 50V	1
C504	404 012 7000	CERAMIC	0.01U P 500V	1
C505	403 074 2701	CERAMIC	0.047U Z 50V	1
R401	401 024 7004	CARBON	1K JA 1/6W	1
R402	401 024 7004	CARBON	1K JA 1/6W	1
R403	401 024 7707	CARBON	100K JA 1/6W	1
R404	401 024 7707	CARBON	100K JA 1/6W	1
R405	401 024 7707	CARBON	100K JA 1/6W	1
R406	401 024 7707	CARBON	100K JA 1/6W	1
R407	401 026 3905	CARBON	330 JA 1/6W	1
R408	401 026 3905	CARBON	330 JA 1/6W	1
R409	401 025 8703	CARBON	220K JA 1/6W	1
R410	401 025 8703	CARBON	220K JA 1/6W	1
R411	401 025 1902	CARBON	15K JA 1/6W	1
R412	401 025 1902	CARBON	15K JA 1/6W	1
R413	401 024 7707	CARBON	100K JA 1/6W	1
R414	401 024 7707	CARBON	100K JA 1/6W	1
R415	401 024 7004	CARBON	1K JA 1/6W	1
R416	401 024 7004	CARBON	1K JA 1/6W	1
R417	401 012 5708	CARBON	1K JA 1/4W	1
R418	401 012 5708	CARBON	1K JA 1/4W	1
R419	401 012 5708	CARBON	1K JA 1/4W	1
R420	401 012 5708	CARBON	1K JA 1/4W	1
R421	401 024 7004	CARBON	1K JA 1/6W	1
R422	401 024 7004	CARBON	1K JA 1/6W	1
R423	401 024 7004	CARBON	1K JA 1/6W	1
R424	401 024 7004	CARBON	1K JA 1/6W	1
R425	401 024 7004	CARBON	1K JA 1/6W	1
R426	401 024 7004	CARBON	1K JA 1/6W	1
R427	401 024 7004	CARBON	1K JA 1/6W	1
R428	401 024 7004	CARBON	1K JA 1/6W	1
R429	402 040 5500	OXIDE-MT	1K JB 1/2W	1
or	401 054 8705	OXIDE-MT	1K JB 1/2W	1
R430	401 016 3809	CARBON	2.2K JA 1/4W	1
R431	401 016 3809	CARBON	2.2K JA 1/4W	1
R437	401 024 7004	CARBON	1K JA 1/6W	1
R438	401 024 7004	CARBON	1K JA 1/6W	1
R441	401 025 8703	CARBON	220K JA 1/6W	1
R442	401 025 8703	CARBON	220K JA 1/6W	1
R443	401 027 8602	CARBON	8.2K JA 1/6W	1
R444	401 023 2802	CARBON	8.2K JA 1/4W	1
R445	401 026 9907	CARBON	4.7K JA 1/6W	1
R446	401 026 9907	CARBON	4.7K JA 1/6W	1
R447	402 015 3104	FUSIBLE RES	100 J- 1/4W	1
R448	402 015 3104	FUSIBLE RES	100 J- 1/4W	1
R453	401 025 2305	CARBON	150K JA 1/6W	1
R454	401 025 2305	CARBON	150K JA 1/6W	1
R455	401 027 8305	CARBON	820 JA 1/6W	1
R456	401 027 8305	CARBON	820 JA 1/6W	1
R457	401 026 9907	CARBON	4.7K JA 1/6W	1
R458	401 026 9907	CARBON	4.7K JA 1/6W	1
R459	401 024 7707	CARBON	100K JA 1/6W	1
R460	401 024 7707	CARBON	100K JA 1/6W	1
R461	401 025 1605	CARBON	1.5K JA 1/6W	1
R462	401 025 1605	CARBON	1.5K JA 1/6W	1
R463	401 014 4105	CARBON	1.5K JA 1/4W	1
R464	401 014 4105	CARBON	1.5K JA 1/4W	1
R465	401 027 3003	CARBON	56K JA 1/6W	1
R466	401 027 3003	CARBON	56K JA 1/6W	1
R467	401 025 7805	CARBON	2.2K JA 1/6W	1
R468	401 025 7805	CARBON	2.2K JA 1/6W	1
R469	401 027 3003	CARBON	56K JA 1/6W	1
R470	401 027 3003	CARBON	56K JA 1/6W	1
R471	402 039 5504	OXIDE-MT	3.3K JB 1/2W	1
or	401 085 6008	OXIDE-MT	3.3K JB 1/2W	1
R472	402 039 5504	OXIDE-MT	3.3K JB 1/2W	1
or	401 085 6008	OXIDE-MT	3.3K JB 1/2W	1
R473	402 039 5504	OXIDE-MT	3.3K JB 1/2W	1
or	401 085 6008	OXIDE-MT	3.3K JB 1/2W	1
R474	402 039 5504	OXIDE-MT	3.3K JB 1/2W	1
or	401 085 6008	OXIDE-MT	3.3K JB 1/2W	1
R475	401 012 4503	CARBON	100 JA 1/4W	1
R476	402 015 3104	FUSIBLE RES	100 J- 1/4W	1

Ref. No.	Part No.	Description		Q'ty
R477	402 040 5906	OXIDE-MT	2.2K JB 1/2W	1
or	401 055 5703	OXIDE-MT	2.2K JB 1/2W	1
R478	402 040 5906	OXIDE-MT	2.2K JB 1/2W	1
or	401 055 5703	OXIDE-MT	2.2K JB 1/2W	1
R479	401 024 7004	CARBON	1K JA 1/6W	1
R480	401 024 7004	CARBON	1K JA 1/6W	1
R481	402 040 7207	WIRE WOUND	0.47 KA 5W	1
R482	402 040 7207	WIRE WOUND	0.47 KA 5W	1
R483	401 024 7004	CARBON	1K JA 1/6W	1
R484	401 024 7004	CARBON	1K JA 1/6W	1
R485	402 040 5500	OXIDE-MT	1K JB 1/2W	1
or	401 054 8705	OXIDE-MT	1K JB 1/2W	1
R486	402 040 5500	OXIDE-MT	1K JB 1/2W	1
or	401 054 8705	OXIDE-MT	1K JB 1/2W	1
R487	402 039 6303	OXIDE-MT	10 JB 1W	1
or	401 058 1207	OXIDE-MT	10 JB 1W	1
R488	402 039 6303	OXIDE-MT	10 JB 1W	1
or	401 058 1207	OXIDE-MT	10 JB 1W	1
R489	401 019 6203	CARBON	4.7 JA 1/4W	1
R490	401 019 6203	CARBON	4.7 JA 1/4W	1
R495	401 027 5908	CARBON	68K JA 1/6W	1
R497	401 027 3003	CARBON	56K JA 1/6W	1
R498	402 041 7909	OXIDE-MT	3.3K JB 2W	1
or	401 067 6200	OXIDE-MT	3.3K JB 2W	1
R499	402 040 5906	OXIDE-MT	2.2K JB 1/2W	1
or	401 055 5703	OXIDE-MT	2.2K JB 1/2W	1
R500	402 040 5708	OXIDE-MT	1.5K JB 1/2W	1
R501	402 041 2003	OXIDE-MT	56 JB 2W	1
or	401 142 6200	OXIDE-MT	56 JB 2W	1
R502	402 040 1809	OXIDE-MT	330 JB 2W	1
or	401 067 5203	OXIDE-MT	330 JB 2W	1
R503	402 041 2003	OXIDE-MT	56 JB 2W	1
or	401 142 6200	OXIDE-MT	56 JB 2W	1
R504	402 016 2106	FUSIBLE RES	220 J- 1/2W	1
R505	402 040 7108	FUSIBLE RES	22 JA 1W	1
R506	401 016 3809	CARBON	2.2K JA 1/4W	1
R507	402 040 5906	OXIDE-MT	2.2K JB 1/2W	1
or	401 055 5703	OXIDE-MT	2.2K JB 1/2W	1
R508	402 040 0505	OXIDE-MT	22 JB 1W	1
or	401 060 1806	OXIDE-MT	22 JB 1W	1
R509	402 040 4008	OXIDE-MT	15 JB 1/2W	1
or	401 099 6209	OXIDE-MT	15 JB 1/2W	1
R510	402 040 5906	OXIDE-MT	2.2K JB 1/2W	1
or	401 055 5703	OXIDE-MT	2.2K JB 1/2W	1
R511	402 039 5504	OXIDE-MT	3.3K JB 1/2W	1
or	401 085 6008	OXIDE-MT	3.3K JB 1/2W	1
R512	402 015 3906	FUSIBLE RES	22 J- 1/4W	1
R513	401 024 6700	CARBON	100 JA 1/6W	1
R514	401 024 6700	CARBON	100 JA 1/6W	1
R515	401 024 6700	CARBON	100 JA 1/6W	1
R516	401 024 6700	CARBON	100 JA 1/6W	1
R518	401 013 5301	CARBON	1.2K JA 1/4W	1
R519	401 021 4105	CARBON	56K JA 1/4W	1
R520	401 027 5502	CARBON	6.8K JA 1/6W	1
R521	401 027 5502	CARBON	6.8K JA 1/6W	1
R523	401 027 9005	CARBON	82K JA 1/6W	1
R524	402 015 3104	FUSIBLE RES	100 J- 1/4W	1
R525	401 025 8208	CARBON	22K JA 1/6W	1
R526	401 026 1307	CARBON	27K JA 1/6W	1
R527	401 024 7400	CARBON	10K JA 1/6W	1
R528	401 025 4903	CARBON	180K JA 1/6W	1
R529	401 024 7707	CARBON	100K JA 1/6W	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
G.EQ P.C.B. ASSY			
66	620 190 9432	G.EQ P.C.B. Assy	1
CN402	620 190 9067	Connector 3P Assy	1
CN403	620 190 9074	Connector 5P Assy	1
VR801	620 190 8817	Rotary VR 2X250KW	1
VR802	620 190 8817	Rotary VR 2X250KW	1
VR803	620 190 8817	Rotary VR 2X250KW	1
VR804	620 190 8817	Rotary VR 2X250KW	1
VR805	620 190 8817	Rotary VR 2X250KW	1
IC801	409 018 4503	IC LA6458DS	1
Q801	405 018 0200	TR 2SC3331-U	1
or	405 018 0101	TR 2SC3331-T	1
Q802	405 018 0200	TR 2SC3331-U	1
or	405 018 0101	TR 2SC3331-T	1
Q803	405 018 0200	TR 2SC3331-U	1
or	405 018 0101	TR 2SC3331-T	1
Q804	405 018 0200	TR 2SC3331-U	1
or	405 018 0101	TR 2SC3331-T	1
Q805	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q806	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q807	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q808	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q809	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
Q810	405 019 2708	TR 2SC536-F-NP	1
or	405 019 3804	TR 2SC536-G-NP	1
C801	403 059 0104	POLYESTER 0.018U K 50V	1
C802	403 059 0104	POLYESTER 0.018U K 50V	1
C803	403 050 7706	ELECT 3.3U M 50V	1
C804	403 050 7706	ELECT 3.3U M 50V	1
C805	403 075 5107	CERAMIC 8200P K 50V	1
C806	403 075 5107	CERAMIC 8200P K 50V	1
C807	403 048 7602	ELECT 0.47U M 50V	1
C808	403 048 7602	ELECT 0.47U M 50V	1
C809	403 073 8407	CERAMIC 4700P K 50V	1
C810	403 073 8407	CERAMIC 4700P K 50V	1
C811	403 063 7809	POLYESTER 0.082U K 50V	1
C812	403 063 7809	POLYESTER 0.082U K 50V	1
C813	403 070 8608	CERAMIC 1500P K 50V	1
C814	403 070 8608	CERAMIC 1500P K 50V	1
C815	403 059 6205	POLYESTER 0.022U K 50V	1
C816	403 059 6205	POLYESTER 0.022U K 50V	1
C817	403 074 9007	CERAMIC 680P K 50V	1
C818	403 074 9007	CERAMIC 680P K 50V	1
C819	403 073 8407	CERAMIC 4700P K 50V	1
C820	403 073 8407	CERAMIC 4700P K 50V	1
C825	403 042 0302	ELECT 10U M 16V	1
C826	403 042 0302	ELECT 10U M 16V	1
C829	403 049 1609	ELECT 1U M 50V	1
C830	403 049 1609	ELECT 1U M 50V	1
C831	403 031 0306	CERAMIC 68P K 50V	1
C832	403 031 0306	CERAMIC 68P K 50V	1
C833	403 009 8105	CERAMIC 100P K 50V	1
C834	403 009 8105	CERAMIC 100P K 50V	1
C835	403 047 1502	ELECT 4.7U M 25V	1
C836	403 047 1502	ELECT 4.7U M 25V	1
R801	401 026 6609	CARBON 390 JA 1/6W	1
R802	401 026 6609	CARBON 390 JA 1/6W	1
R803	401 026 6609	CARBON 390 JA 1/6W	1
R804	401 026 6609	CARBON 390 JA 1/6W	1
R805	401 026 6609	CARBON 390 JA 1/6W	1
R806	401 026 6609	CARBON 390 JA 1/6W	1
R807	401 026 6609	CARBON 390 JA 1/6W	1
R808	401 026 6609	CARBON 390 JA 1/6W	1
R809	401 026 6609	CARBON 390 JA 1/6W	1
R810	401 026 6609	CARBON 390 JA 1/6W	1
R811	401 027 8602	CARBON 8.2K JA 1/6W	1
R812	401 027 8602	CARBON 8.2K JA 1/6W	1
R813	401 027 8602	CARBON 8.2K JA 1/6W	1
R814	401 027 8602	CARBON 8.2K JA 1/6W	1
R815	401 027 8602	CARBON 8.2K JA 1/6W	1
R816	401 027 8602	CARBON 8.2K JA 1/6W	1
R817	401 027 8602	CARBON 8.2K JA 1/6W	1
R818	401 027 8602	CARBON 8.2K JA 1/6W	1
R819	401 027 8602	CARBON 8.2K JA 1/6W	1
R820	401 027 8602	CARBON 8.2K JA 1/6W	1
R821	401 025 0004	CARBON 120K JA 1/6W	1
R822	401 025 0004	CARBON 120K JA 1/6W	1
R823	401 024 7707	CARBON 100K JA 1/6W	1
R824	401 024 7707	CARBON 100K JA 1/6W	1
R825	401 026 7408	CARBON 39K JA 1/6W	1
R826	401 026 7408	CARBON 39K JA 1/6W	1
R827	401 026 4605	CARBON 33K JA 1/6W	1
R828	401 026 4605	CARBON 33K JA 1/6W	1
R829	401 025 8208	CARBON 22K JA 1/6W	1
R830	401 025 8208	CARBON 22K JA 1/6W	1
R831	401 024 9305	CARBON 1.2K JA 1/6W	1
R832	401 024 9305	CARBON 1.2K JA 1/6W	1
R833	401 024 9305	CARBON 1.2K JA 1/6W	1
R834	401 024 9305	CARBON 1.2K JA 1/6W	1
R835	401 025 1605	CARBON 1.5K JA 1/6W	1
R836	401 025 1605	CARBON 1.5K JA 1/6W	1
R837	401 025 1605	CARBON 1.5K JA 1/6W	1
R838	401 025 1605	CARBON 1.5K JA 1/6W	1
R839	401 025 1605	CARBON 1.5K JA 1/6W	1
R840	401 025 1605	CARBON 1.5K JA 1/6W	1
R841	401 024 7004	CARBON 1K JA 1/6W	1
R842	401 024 7004	CARBON 1K JA 1/6W	1
R843	401 024 7707	CARBON 100K JA 1/6W	1
R844	401 024 7707	CARBON 100K JA 1/6W	1
R845	401 024 7707	CARBON 100K JA 1/6W	1
R846	401 024 7707	CARBON 100K JA 1/6W	1
R847	401 026 9907	CARBON 4.7K JA 1/6W	1
R848	401 026 9907	CARBON 4.7K JA 1/6W	1
R849	401 026 9907	CARBON 4.7K JA 1/6W	1
R850	401 026 9907	CARBON 4.7K JA 1/6W	1
VR P.C.B. ASSY			
67	620 193 2874	VR P.C.B. Assy	1
	620 182 7811	Switch Push 1KEY	1
PC401	620 190 9197	Jumper	1
VR601	620 190 8831	Rotary VR 2X100KA	1
VR602	620 190 8824	Rotary VR 200KW	1
C601	403 072 4509	CERAMIC 270P K 50V	1
C602	403 072 4509	CERAMIC 270P K 50V	1
C603	403 061 4206	POLYESTER 0.039U K 50V	1
C604	403 061 4206	POLYESTER 0.039U K 50V	1
R601	401 026 9907	CARBON 4.7K JA 1/6W	1
R602	401 026 9907	CARBON 4.7K JA 1/6W	1
R603	401 027 5502	CARBON 6.8K JA 1/6W	1
R604	401 027 5502	CARBON 6.8K JA 1/6W	1
MODE SWITCH P.C.B. ASSY			
68	620 190 9456	Mode Switch P.C.B. Assy	1
	620 182 7811	Switch Push 1KEY	1
PC402	620 190 9180	Jumper	1
POWER IND P.C.B. ASSY			
69	620 190 9463	Power IND P.C.B. Assy	1
PC405	620 190 9159	Jumper	1
D702	407 109 1301	LED SEL1122P	1
SP SW,HP P.C.B. ASSY			
70	620 190 9470	SP SW,HP P.C.B. Assy	1
	620 016 5815	Switch Push 1 Key	1
	620 189 9641	Jack 7P Black	1
PC404	620 190 9166	Jumper	1
R701	402 039 9205	OXIDE-MT 470 JB 1W	1
or	401 062 1309	OXIDE-MT 470 JB 1W	1
R702	402 039 9205	OXIDE-MT 470 JB 1W	1
or	401 062 1309	OXIDE-MT 470 JB 1W	1
R703	401 014 2903	CARBON 150 JA 1/4W	1
R704	401 014 2903	CARBON 150 JA 1/4W	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
SP TERMINAL P.C.B. ASSY			
71	620 193 2881	SP Terminal P.C.B. Assy	1
	620 020 5887	Connector 1P Assy	1
	620 185 1953	Push Terminal 8P	1
PC701	620 190 9173	Jumper	1
C701	403 069 0705	CERAMIC 1000P K 50V	1
C702	403 069 0705	CERAMIC 1000P K 50V	1
C703	403 069 0705	CERAMIC 1000P K 50V	1
C704	403 069 0705	CERAMIC 1000P K 50V	1
C705	403 069 0705	CERAMIC 1000P K 50V	1
C706	403 069 0705	CERAMIC 1000P K 50V	1
TERMINAL P.C.B. ASSY			
72	620 193 2904	Terminal P.C.B. Assy	1
	620 022 2587	EC Terminal 1P	2
	620 031 4763	Wire Wrap Terminal	6
FUSE TERMINAL ASSY			
73	620 193 2911	Fuse Terminal Assy	1
	620 017 2738	Fuse Clip	6
	⚠ 423 005 0507	FUSE 250V T1A	1
	⚠ 423 007 2103	FUSE 250V T4A	2
	620 031 4763	Wire Wrap Terminal	6
	620 193 5370	Label Fuse (T4A)	1
S/D IND P.C.B. ASSY			
74	620 193 2928	S/D IND P.C.B. Assy	1
D701	407 016 5409	LED LN324GP	1

Ref. No.	Part No.	Description	Q'ty
S/D SWITCH P.C.B. ASSY			
75	620 193 2935	S/D Switch P.C.B. Assy	1
	620 191 0315	Push Switch 1KEY	1
	620 055 2349	Jumper	1
R605	401 024 9701	CARBON 12K JA 1/6W	1
R606	401 024 9701	CARBON 12K JA 1/6W	1
R607	401 027 3003	CARBON 56K JA 1/6W	1
R608	401 027 3003	CARBON 56K JA 1/6W	1

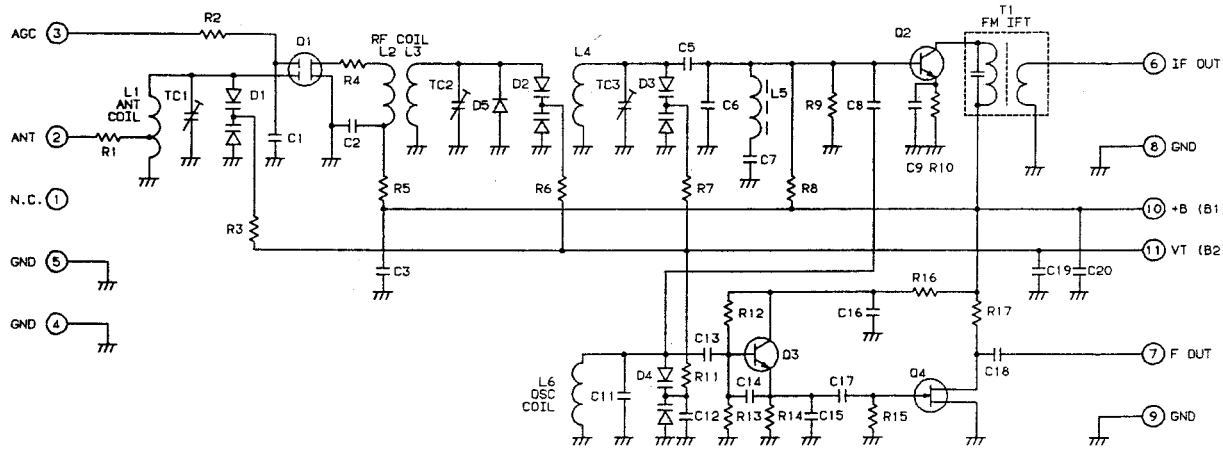
NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

PRODUCT SAFETY NOTICE

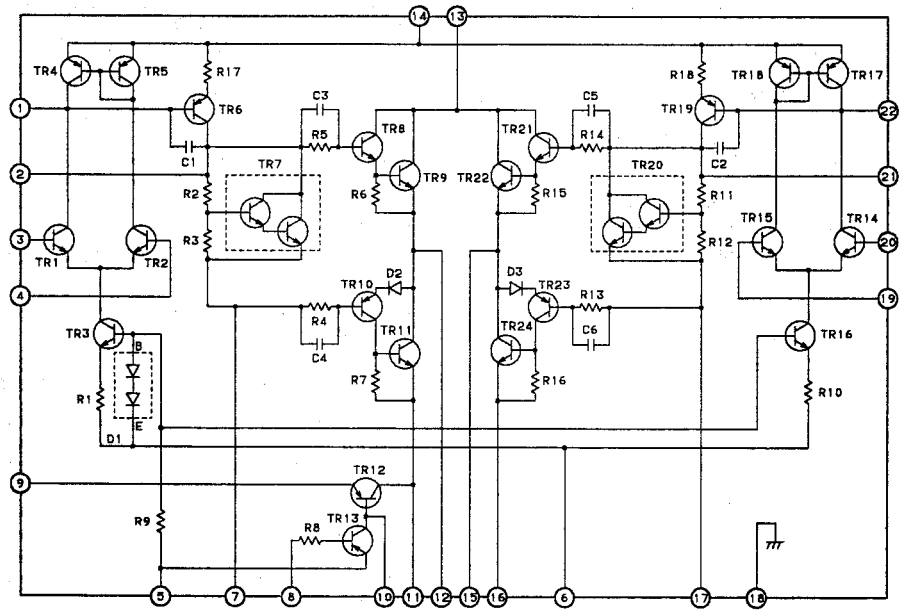
Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

FRONT END SCHEMATIC DIAGRAM

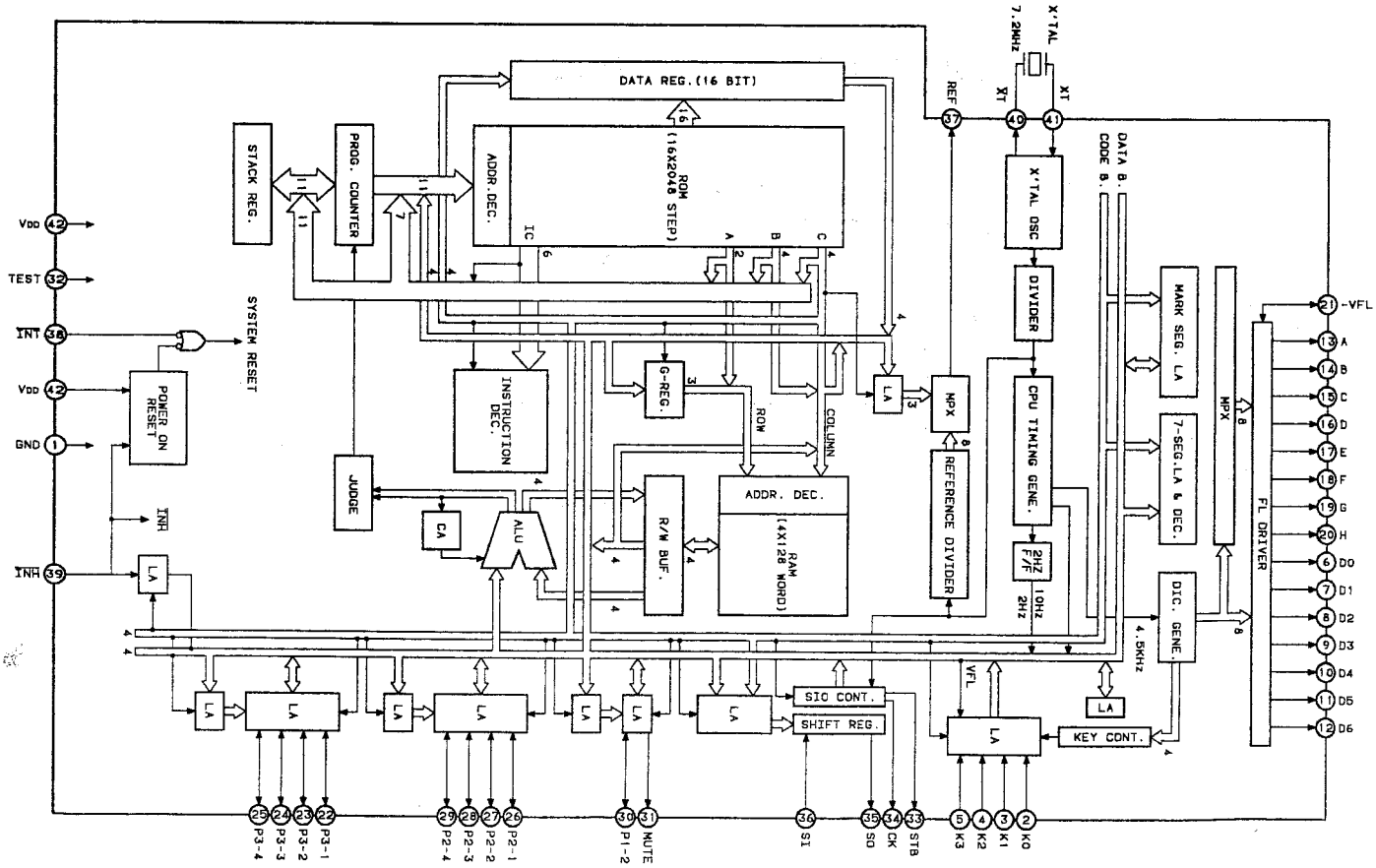


IC BLOCK DIAGRAM

STK4171MK5-SA BLOCK DIAGRAM

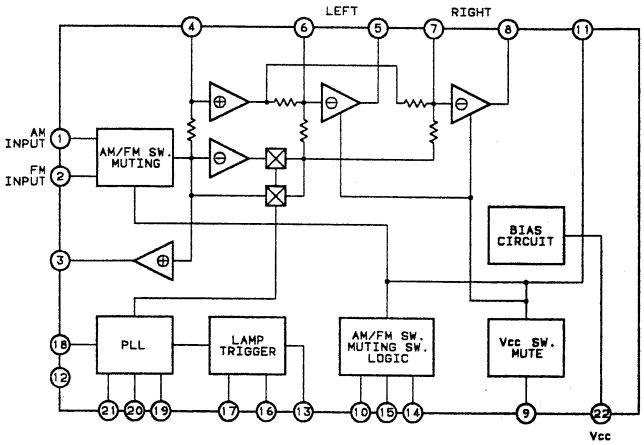


TSE1039AN-012 BLOCK DIAGRAM

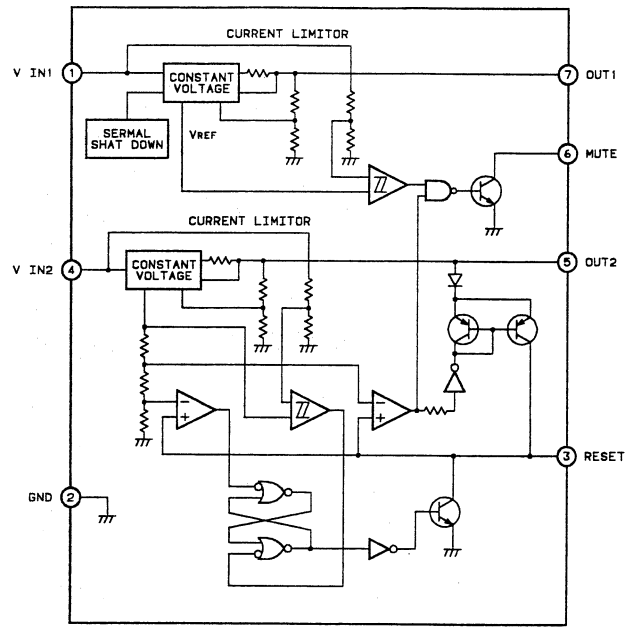


IC BLOCK DIAGRAM (Continued)

LA3400 BLOCK DIAGRAM



LA5667 BLOCK DIAGRAM



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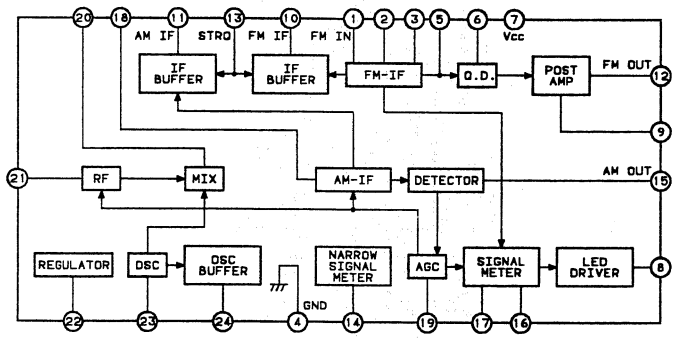

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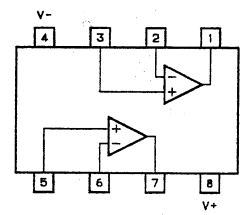
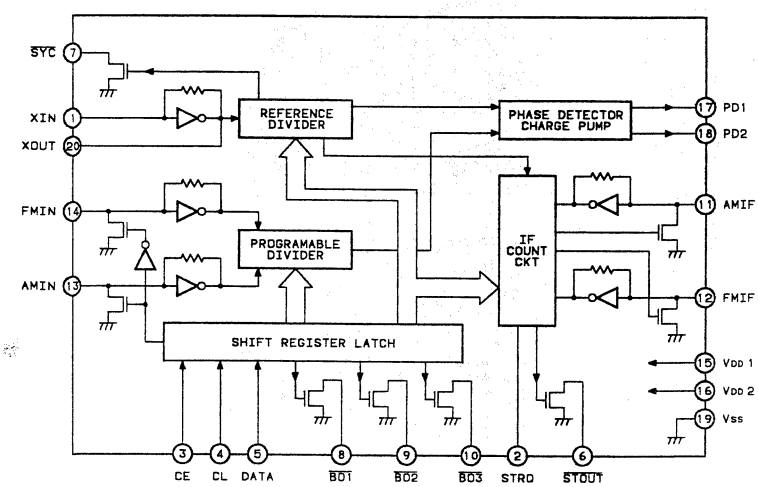
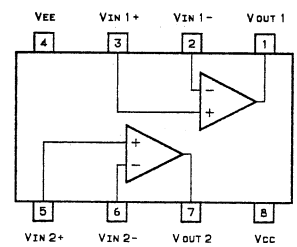


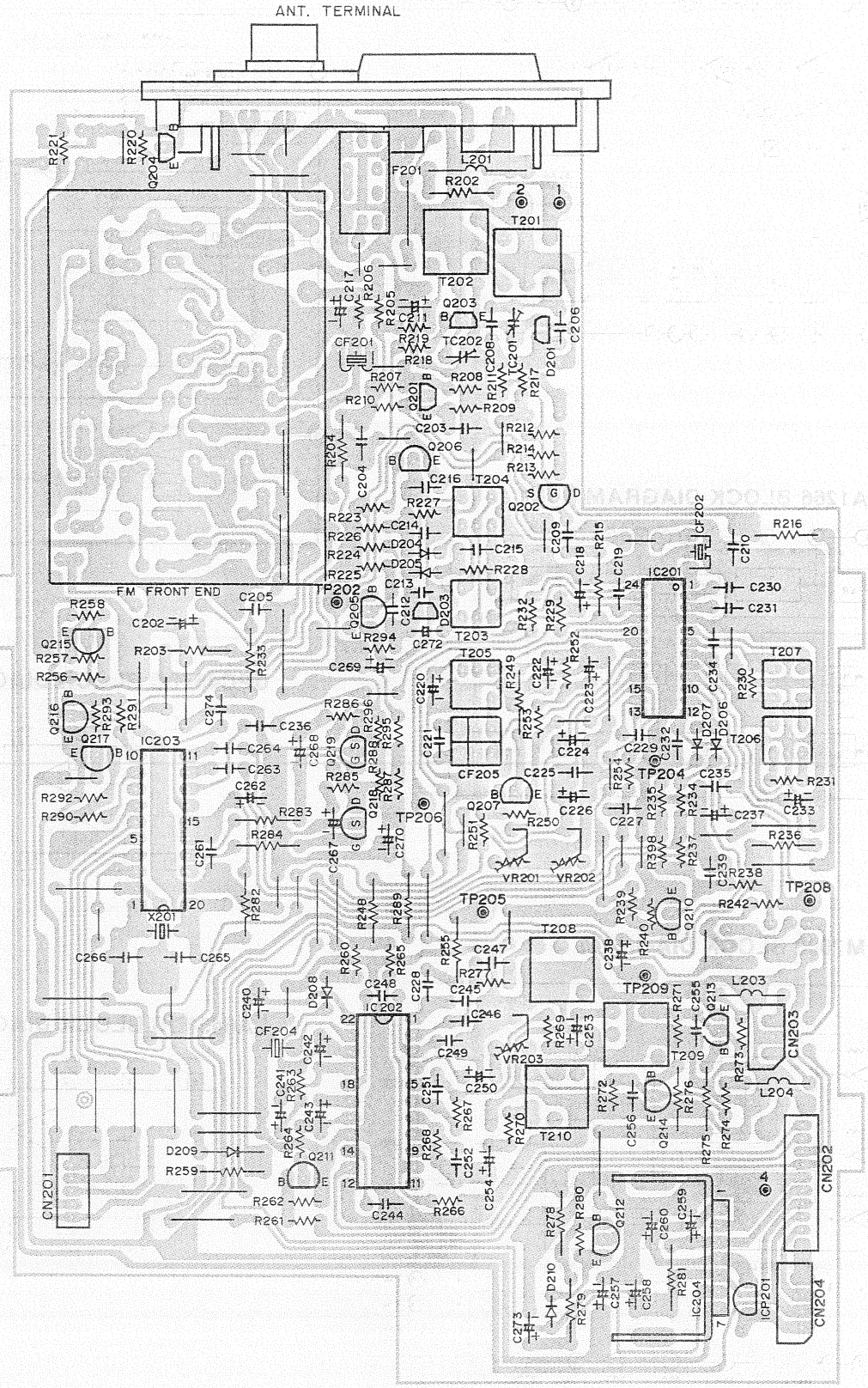
LM7000 BLOCK DIAGRAM



LA6458DS BLOCK DIAGRAM



TUNER PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



IC & TRANSISTOR DC VOLTAGES

IC PIN NUMBERS DC VOLTAGES																					
Ref. No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC201	LA1266	2.4	2.4	2.4	0	12.0	12.0	12.0	5.3	3.6	2.4	2.6	3.2	0	1.5	1.2	0	0	2.4	1.2	0
		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
		4.0	4.0	4.0	3.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

IC PIN NUMBERS DC VOLTAGES																					
Ref. No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC202	LA3400	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	0	0	0	5.3	4.9	0	2.9	2.9	2.9	2.9	2.9
		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
		3.5	10.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

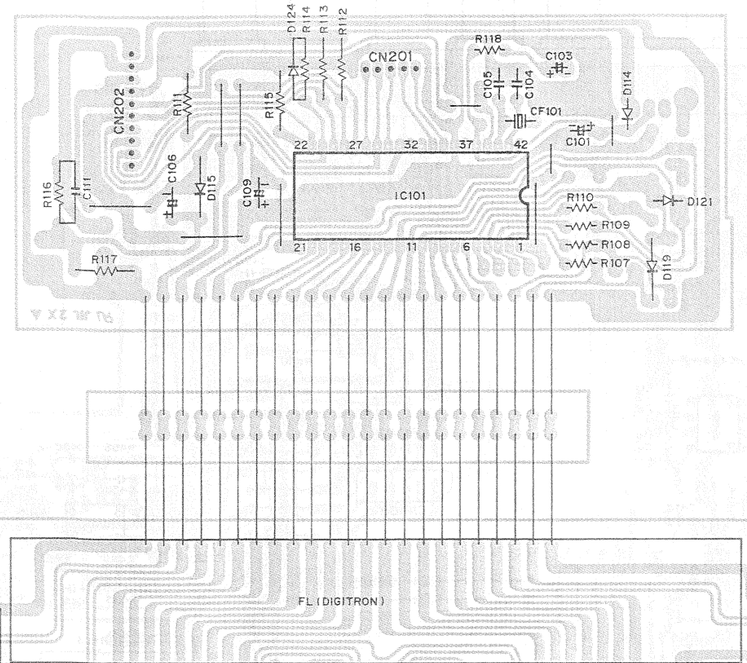
IC PIN NUMBERS DC VOLTAGES																					
Ref. No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC203	LM7000	1.5	0	0	0	0	5.4	0	0	12.7	12.7	0	0	0	2.7	5.1	5.1	1.1	1.1	0	1.5
IC204	LA5667	24.3	0	4.9	24.3	0	4.2	13.1	–	–	–	–	–	–	–	–	–	–	–	–	–
IC401	UPC4570C	0	0	0	−15.0	0	0	0	15.0	–	–	–	–	–	–	–	–	–	–	–	–
IC402	UPC4570C	0	0	0	−10.0	0	0	0	−10.0	–	–	–	–	–	–	–	–	–	–	–	–
IC801	LA6458DS	0	0	0	−15.0	0	0	0	15.1	–	–	–	–	–	–	–	–	–	–	–	–

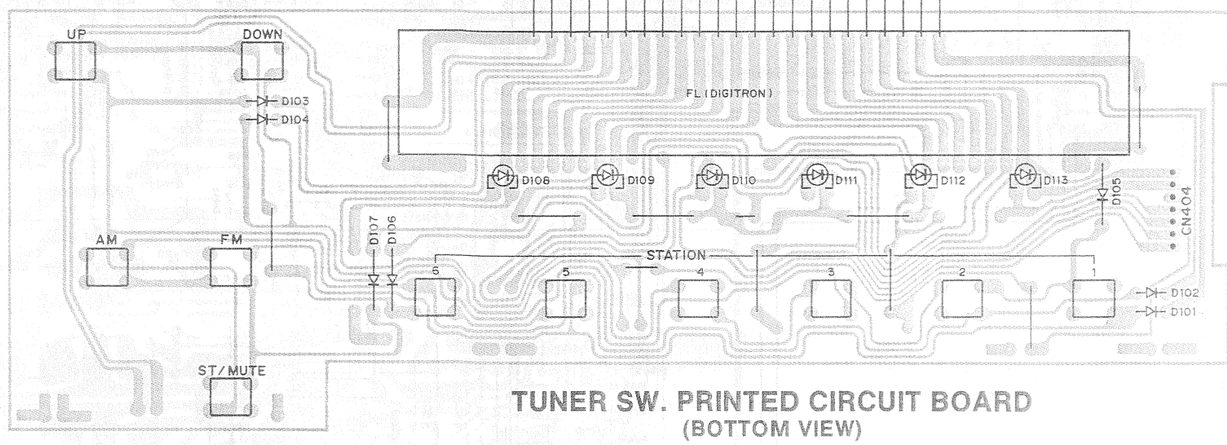
IC PIN NUMBERS DC VOLTAGES																					
Ref. No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC403	STK4171	40.3	1.2	−0.1	−0.1	0	−40.8	−1.3	3.6	−42.4	−43.5	−43.5	0	42.7	41.2	0	−43.5	−1.3	0	−0.1	−0.1
		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
		1.1	40.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

TRANSISTOR & FET DC VOLTAGES														
Ref. No.	DEVICE	B (D)	C (G)	E (S)	Ref. No.	DEVICE	B (D)	C (G)	E (S)	Ref. No.	DEVICE	B (D)	C (G)	E (S)
Q201	2SC2839	1.8	11.9	1.1	Q401	2SC3331	−1.1	15.2	−1.8	Q804	2SC3331	−0.6	14.6	−1.3
Q202	2SK246	10.9	4.2	6.8	Q402	2SC3331	−0.9	15.3	−1.5	Q805	2SC536	−0.3	14.5	−0.9
Q203	2SD1012	0	12.5	0	Q403	2SC536	0	1.0	0	Q806	2SC536	−0.2	14.4	−0.8
Q204	2SD1012	0	4.5	0	Q404	2SC536	0	1.0	0	Q807	2SC536	−0.3	14.5	−0.9
Q205	2SC536	0.7	0	0	Q405	2SA608	0	−1.2	0	Q808	2SC536	−0.2	14.5	−0.8
Q206	2SC536	0	13.0	0	Q406	2SA608	0	−1.2	0	Q809	2SC536	−0.1	14.5	−0.7
Q207	2SA608	0.8	1.2	1.2	Q411	2SD1913	18.9	35.5	18.3	Q810	2SC536	−0.1	14.5	−0.8
Q210	2SC536	0	13.0	0	Q412	2SB560	−18.9	−29.5	−18.3					
Q211	2SC536	0	3.0	0	Q413	2SA984	−28.7	−40.4	−28.0					
Q212	2SA608	4.3	4.9	5.0	Q414	2SD1913	25.8	36.7	25.3					
Q213	2SC536	0.6	0	0	Q415	2SC536	−0.4	0	0					
Q214	2SC536	0.6	0	0	Q416	2SC536	−0.2	0	0					
Q215	2SC536	0	0.7	0	Q417	2SA608	9.8	−0.1	9.9					
Q216	2SA608	12.8	0	13.1	Q418	2SA1317	4.3	−43.7	0					
Q217	2SA608	13.1	0	12.8	Q801	2SC3331	−0.7	14.5	−1.4					
Q218	2SK583	0.9	1.2	0	Q802	2SC3331	−0.7	14.5	−1.3					
Q219	2SK583	1.4	1.0	0	Q803	2SC3331	−0.6	14.4	−1.3					

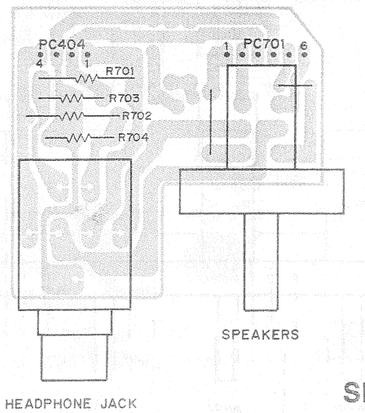
NOTES:
All voltages indicated on the schematics are measured under the following conditions.
a. Use a V.T.V.M.
b. All voltages ±10 % with respect to chassis ground.
c. No signals at input terminals.
d. AC input at 220 volts 50 Hz.

SYNTHESIZER PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



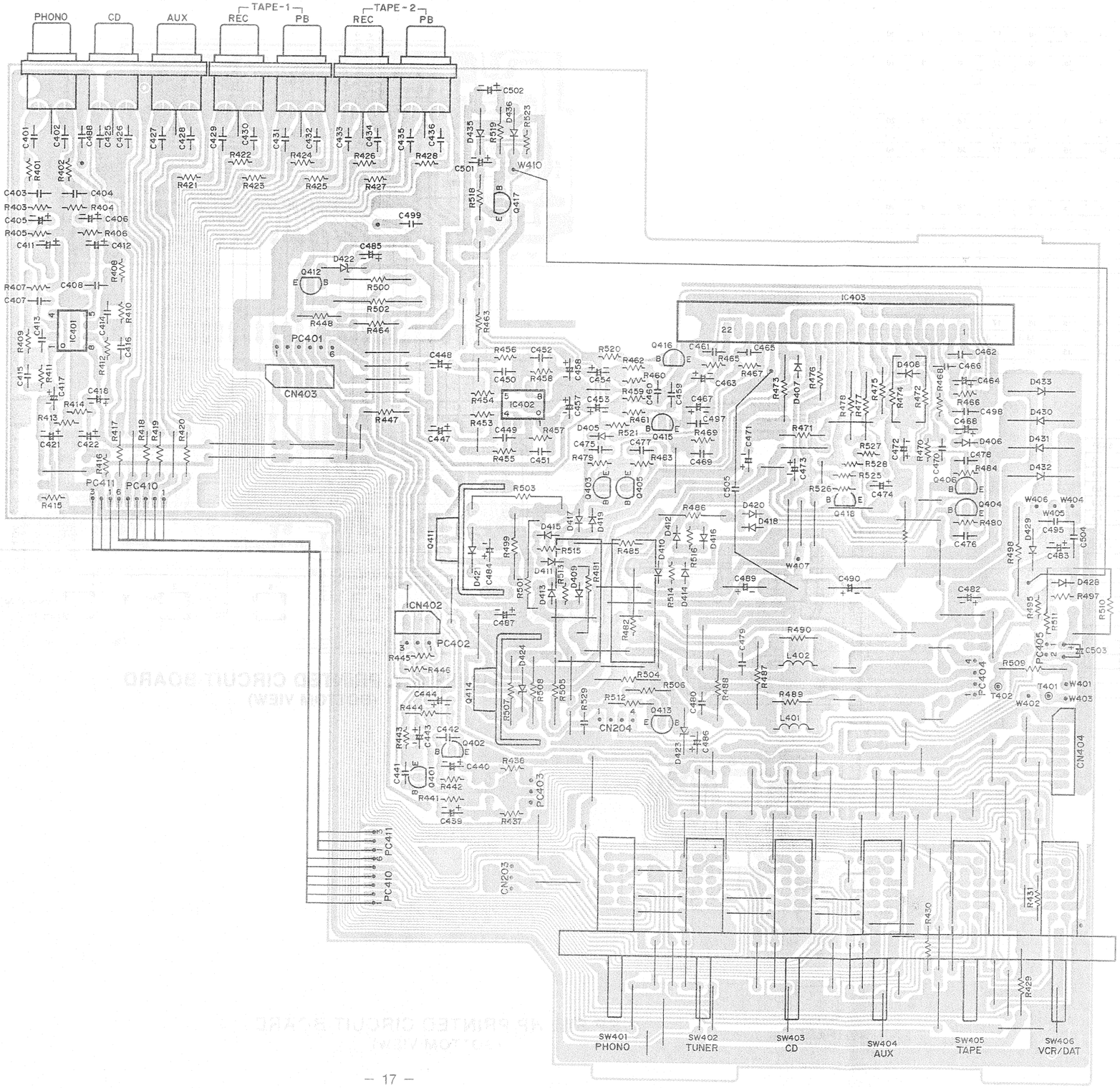


TUNER SW. PRINTED CIRCUIT BOARD
(BOTTOM VIEW)

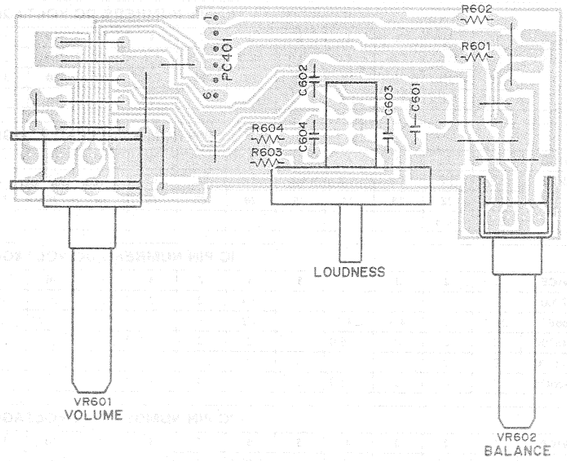


SP SW. HP PRINTED CIRCUIT BOARD
(BOTTOM VIEW)

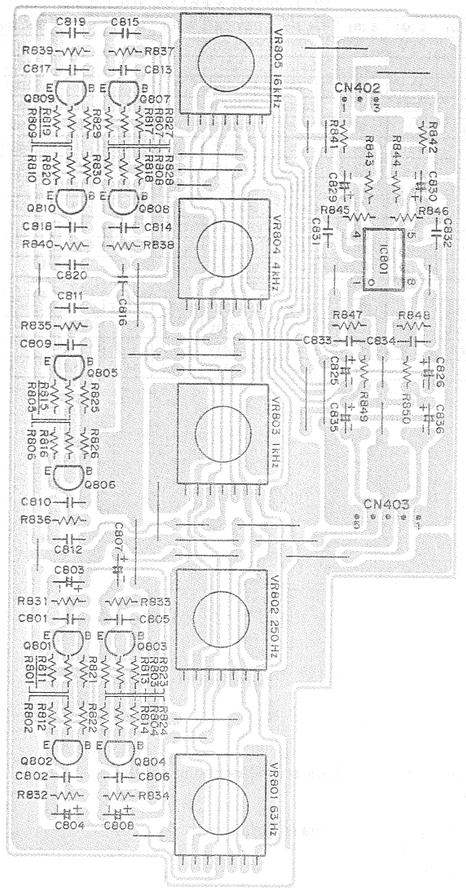
MAIN AMPLIFIER PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



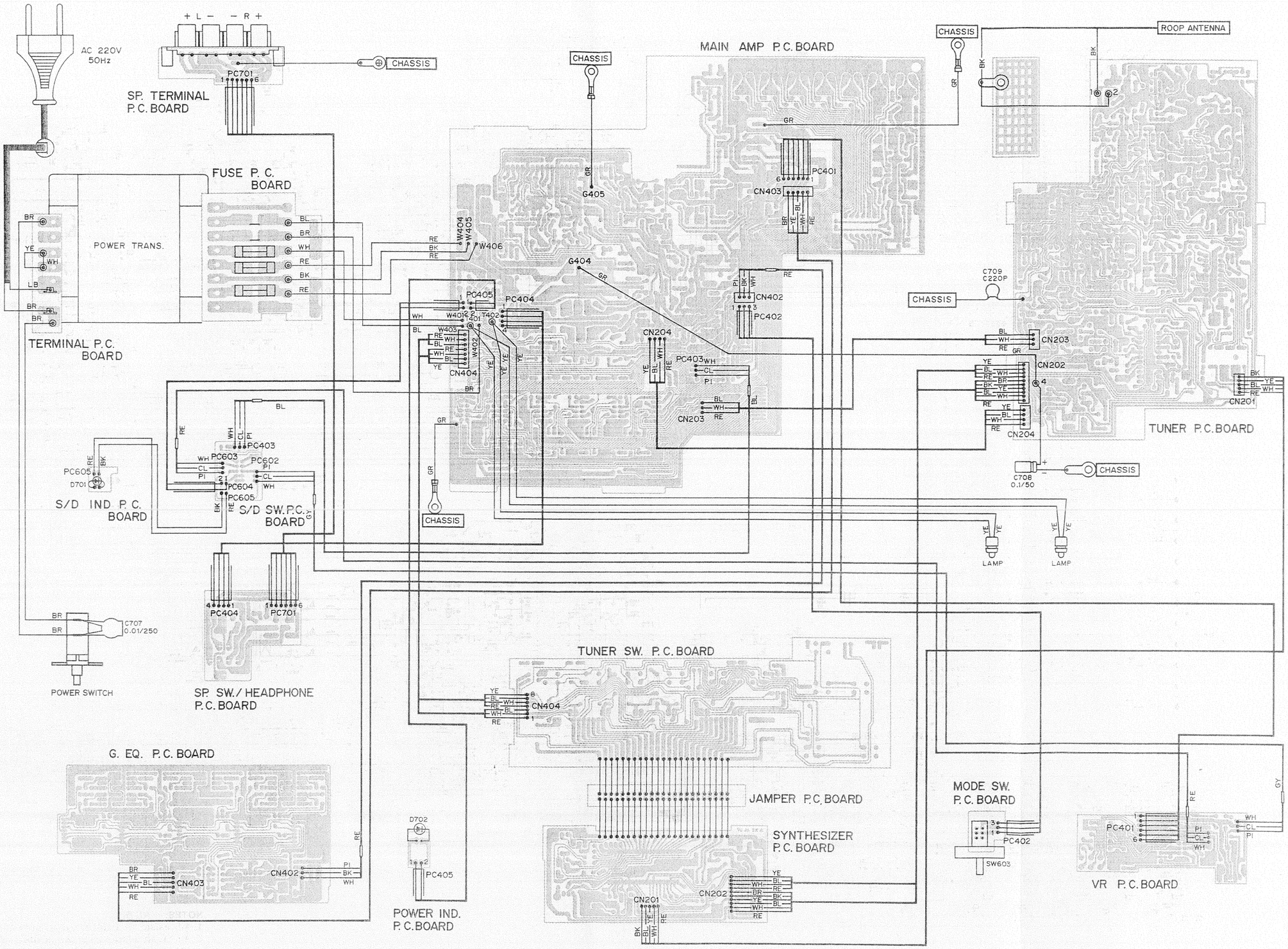
VR PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



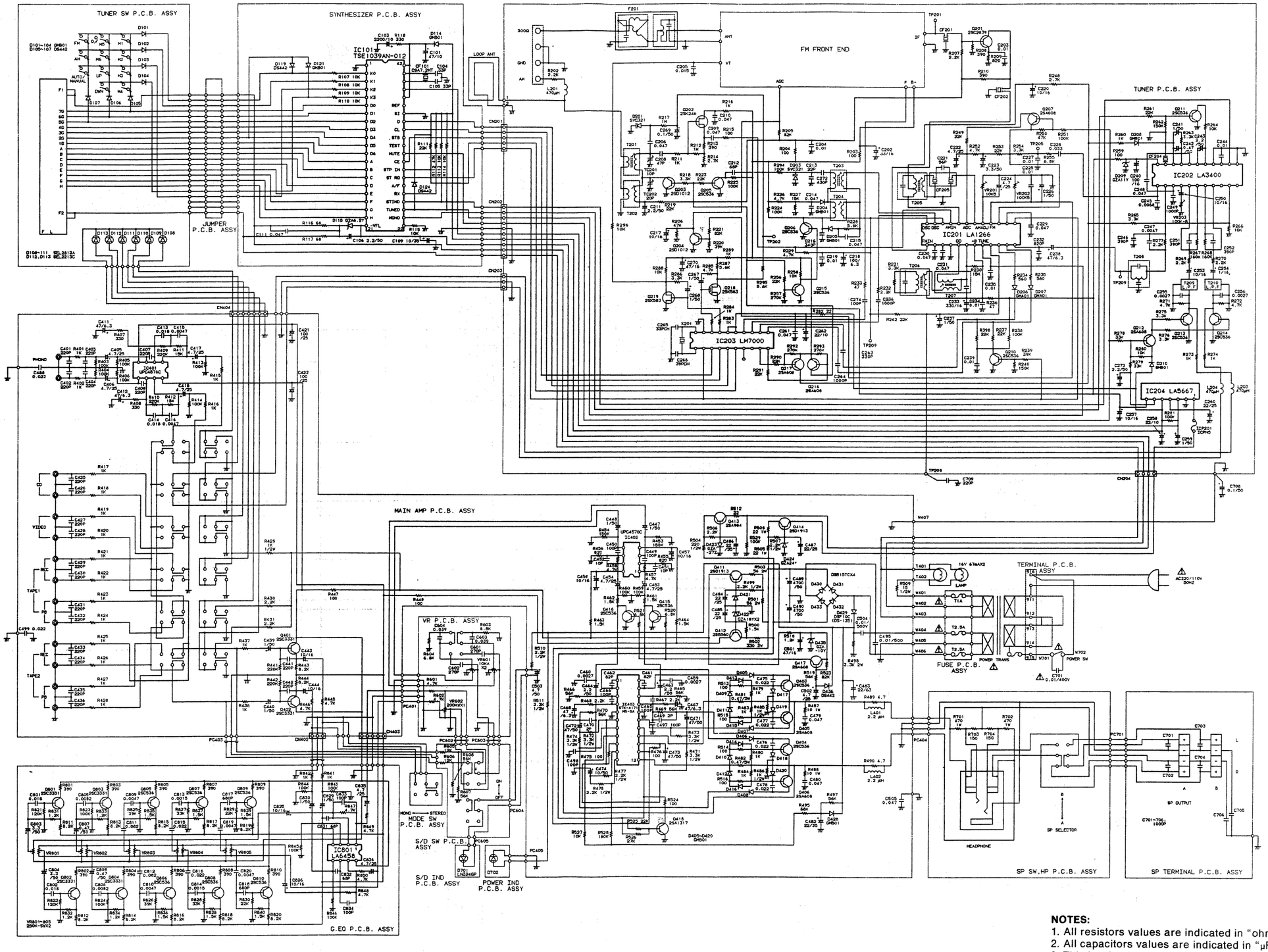
G-EQ PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



POINT TO POINT WIRING DIAGRAM



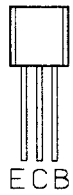
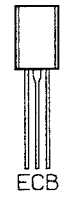
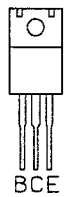
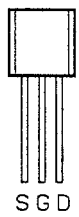
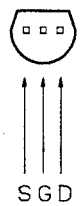
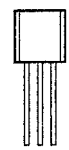
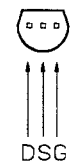
SCHEMATIC DIAGRAM



NOTES:

1. All resistors values are indicated in "ohm" (K = 10^3, M = 10^6).
2. All capacitors values are indicated in "μF" (P = 10^{-12}).
3. This is a basic schematic diagram.

IC & TRANSISTOR LEAD IDENTIFICATION

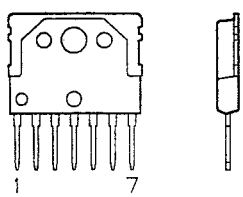
TRANSISTOR	FRONT VIEW	BOTTOM VIEW	TRANSISTOR	FRONT VIEW	BOTTOM VIEW
2SA608 2SA984 2SC3331 2SC536			2SB560		
2SD1913			2SA1317 2SC2839 2SD1012		
2SK246			2SK583		

TERMINAL NAME

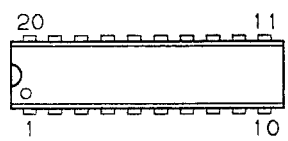
B → BASE
C → COLLECTOR
E → EMITTER

S → SOURCE
G → GATE
D → DRAIN

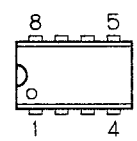
LA5667 FRONT/SIDE VIEWS



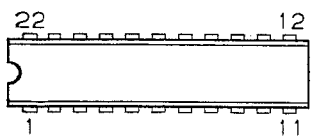
LM7000 TOP VIEW



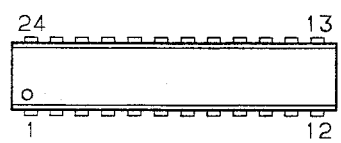
UPC4570C TOP VIEW



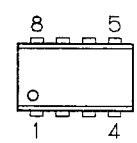
LA3400 TOP VIEW



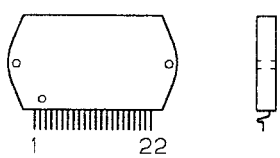
LA1266 TOP VIEW



LA6458DS TOP VIEW



STK4171MK5-SA FRONT/SIDE VIEWS



TSE1039AN-012 TOP VIEW